



India's Agrarian Crisis and Smallholder Producers'
Participation in New Farm Supply Chain Initiatives:
A Case Study of Contract Farming

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India's Agrarian Crisis and Smallholder Producers' Participation in New Farm Supply Chain Initiatives: A Case Study of Contract Farming¹

Vijay Paul Sharma²

Abstract

Indian agriculture is at crossroads and one of the major challenges is to reverse deceleration in agricultural growth. Main reason for deceleration in agricultural growth is declining investment particularly public investment in agriculture research and development and irrigation, combined with inefficiency of institutions providing inputs and services including rural credit and extension. Other factors such as land fragmentation, out-dated tenancy laws, lack of modern market and rural infrastructure, inappropriate input pricing policies, etc. are also responsible for agrarian and ecological crisis in the country. The crisis of stagnation in agriculture needs urgent attention. The government has renewed focus on agriculture and promoting public-private partnership to accelerate growth in the rural economy. Many Indian and multi-national agribusiness companies have entered Indian agribusiness sector. The central government has also initiated reforms in outdated laws such as Agricultural Produce Marketing Committee (APMC) Act, Essential Commodities Act (ECA), and given some incentives like waiver of market fee, rural development tax, etc. for companies making investment in agribusiness sector. The central as well as state governments are promoting involvement of corporate sector in agriculture through contract farming with a view to enable farmer to have access to better inputs, extension services and credit from agribusiness companies. Contract farming is also supposed to eliminate and/or reduce markets and price risks, which farmers face. However, it all depends on the nature of contracts, legislation for regulation of contract farming, enforcement, dispute resolution mechanisms, etc.

This paper tries to understand socio-economic implications of corporate-led initiatives in agriculture (mainly contract farming) in the state of Punjab, which has more experience in contract farming compared to other states. The results indicate that contract farming is a good initiative for medium and large-scale farmers producing for the market but the long-term success of such initiatives will depend on how a large number of small and marginal farmers can be linked to restructured markets under changing market and policy environment. The study points out that it is important to provide an integrated set of services including credit and not just seed and limited extension services. Partnership between public and private sector companies/organizations is needed in order to provide these integrated services. More important is to improve bargaining power of smallholder producers while also reducing transaction costs for companies through promotion of producers' groups/ association/ cooperatives. Small farmers will be able to effectively participate in the changing markets and establish links with new market chains (supermarkets, agribusiness companies, processors, exporters, etc.) only if they have access to basic infrastructure, quality inputs and services and are organized.

Key Words: Agrarian crisis, smallholder participation, contract farming, agribusiness, land tenancy, public-private partnership

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Importance of Agriculture in Indian Economy

The direct contribution of the agriculture sector to national economy is reflected by its share in total GDP, its foreign exchange earnings, and its role in supplying savings and labor to other sectors. Agriculture and allied sectors like forestry and fishing accounted for 18.5 percent of total Indian Gross Domestic Product (GDP) in 2005-06 (at 1999-2000 constant prices) and employed about 58 percent of the country's workforce (CSO, 2007). It accounted for 10.95 percent of India's exports in 2005-06 (GoI, 2007) and about 46 percent of India's geographical area is used for agricultural activity.

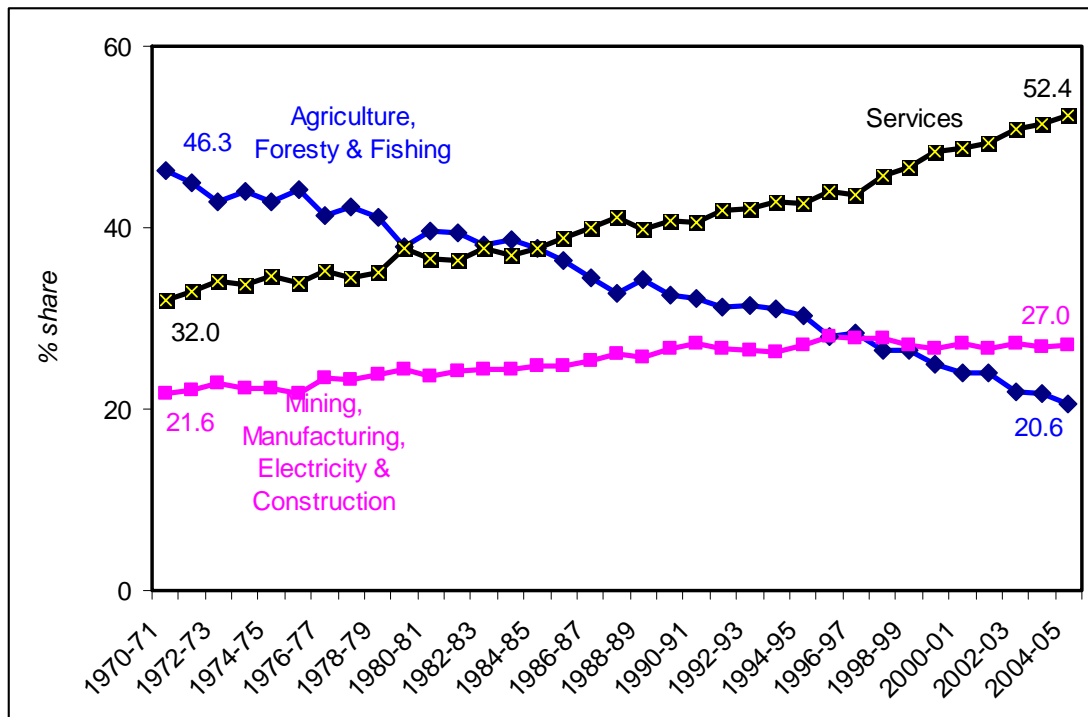
There has been a structural transformation in the Indian economy during the past few decades. The composition of Gross Domestic Product at 1993-94 constant prices reveals that the share of agriculture including forestry and fishing has declined as growth in industrial and services sectors far outpaced agricultural sector (Figure 1). The share of mining, manufacturing, electricity and construction sector has increased from 21.6 percent in 1970-71 to 27 percent in 2004-05 and services sector has increased significantly from 32 percent to 52.4 percent during the same period. Despite a steady decline of its share in the GDP, agriculture is still an important sector and plays a significant role in the overall socio-economic development of the country. Therefore, fostering rapid, sustained and broad-based growth in agriculture remains key priority for the government.

Consistent with the trends of economic development at national level, role of agricultural sector in the state economies is also changing rapidly. The share of agriculture in Gross State Domestic Product (GSDP) has declined significantly during the last two decades. In some States, such as Bihar, Punjab, Uttar Pradesh, Haryana, Rajasthan, and Orissa, the sector today contributes more than one-quarter of GSDP, while in some states, such as Gujarat, Kerala, Karnataka, Tamil Nadu and Maharashtra, the sector contributes less than 20 percent to GSDP (Figure 2). However, contribution of agriculture to GSDP has declined in almost all States between 1993-94 and 2004-05. The decline was the highest in Karnataka (16%), followed by Haryana (14.2%), and Kerala (13.7%). In Karnataka, decline was mainly due to significant increase in the share of service sector (from 37.9% in 1993-94 to 54.7% in 2004-05) mainly driven by informational technology (IT) industry. Similar is the case with Haryana the decline is due to faster development of services sector in cities around the national capital, Delhi.

Despite declining share of agriculture in the economy, majority of workforce continue to depend on agricultural sector for employment and in rural areas dependence on agriculture is more as nearly 75 percent of rural population is employed in agricultural sector. However, there is disguised employment in the sector due to limited opportunities for rural non-farm employment. This disguised employment leads to lower labor and resources productivity in the sector relative to other sectors of the economy. The low labor productivity leads to higher rates of poverty in rural areas (Figure 3).

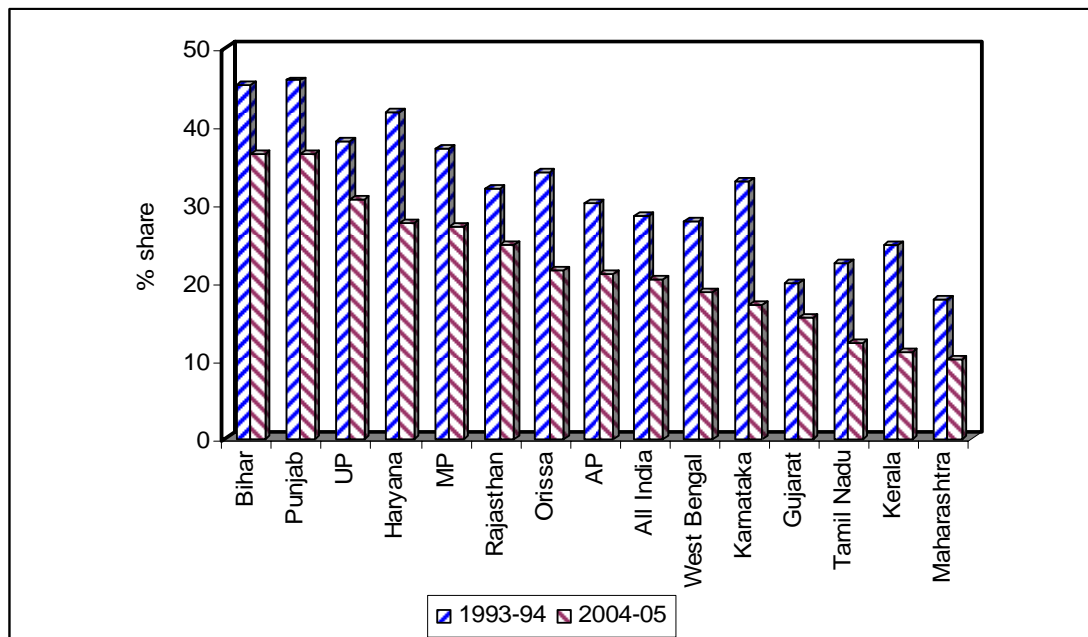
Agriculture in India is constitutionally the responsibility of the states rather than the central government. The central government's role is in formulating policy and providing financial resources for agriculture to the states.

Figure 1. Share of Agriculture, Manufacturing and Services Sector in National GDP in India: 1993-94 – 2004-05



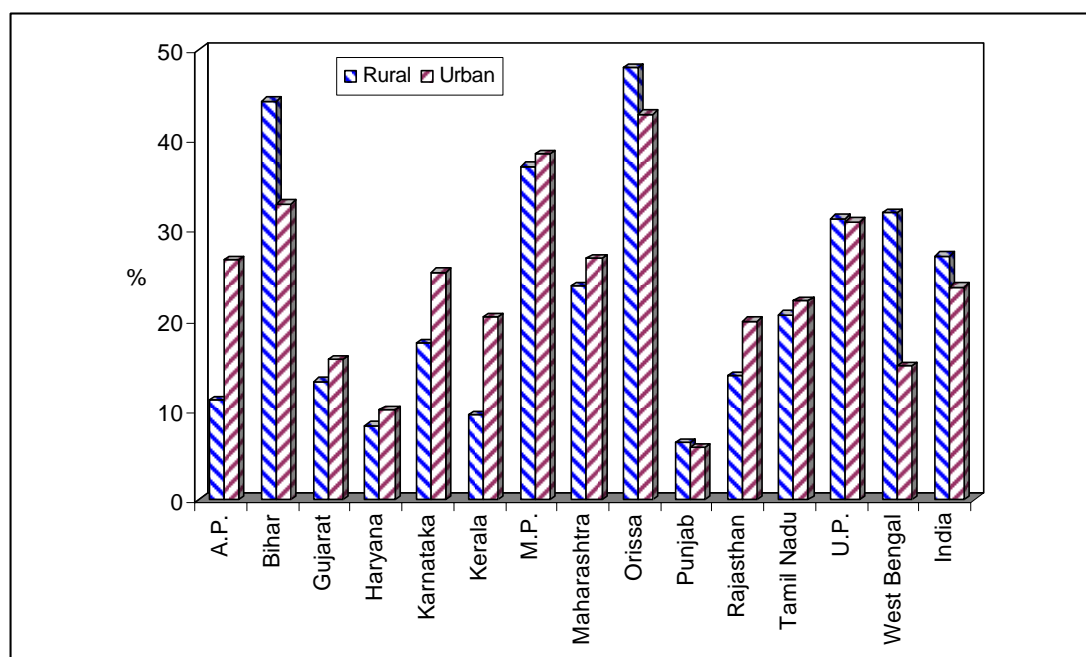
Source: CSO (2007)

Figure 2. Share of Agriculture and Allied sectors in GSDP in selected States: 1993-94 – 2004-05



Source: CSO (2007)

Figure 3. Selected State-wise Estimates of Rural and Urban Poverty Ratio by Planning Commission in India, 1999



Source: Planning Commission (2002)

Section I: India's Agrarian Crisis

Deceleration in Agricultural Growth

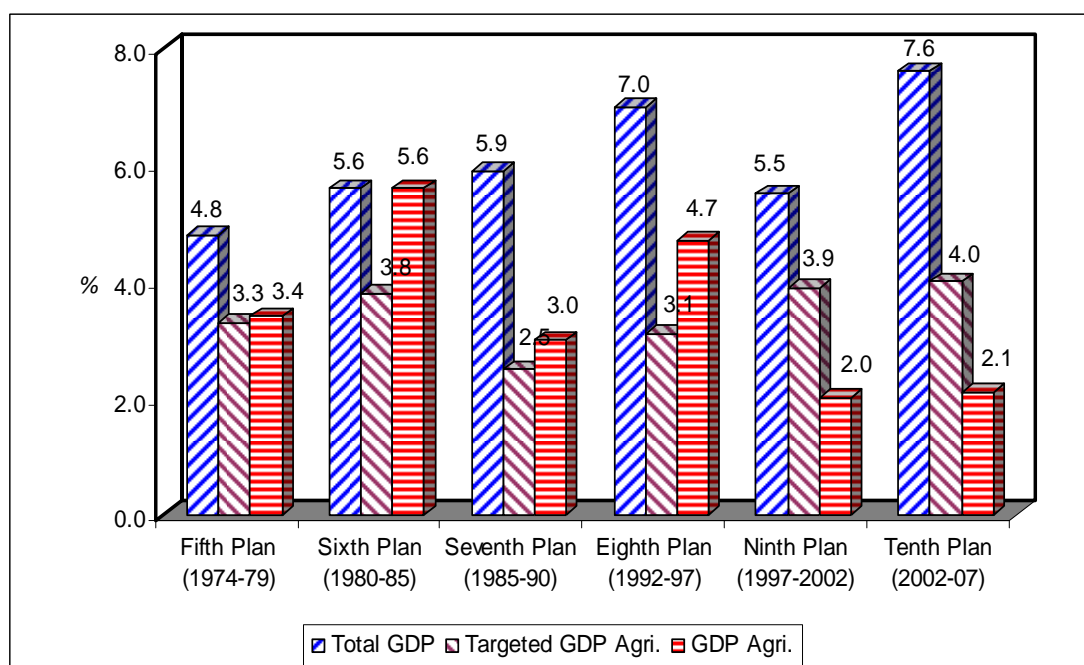
India's GDP grew at an annual rate of 5.8 percent from 1995-96 to 2004-05 at 1993-94 constant prices, but agricultural growth declined to about 2 percent, resulting from stagnation/decline in productivity during the last decade. Plan-wise trends of growth of total GDP and GDP from agriculture are presented in Figure 4. It is evident from the figure that India's agricultural sector has grown more than targeted growth rate during the 6th, 7th and 8th Five Year Plans but fell short of targeted growth during the 9th and 10th Plan. During the 10th Plan, agricultural GDP grew at an annual rate of mere 2.1 percent against the targeted growth rate of 4 percent. Indian agriculture is at a crossroads. With about 70 percent population living in rural areas and about 58 percent of its workforce engaged in agriculture, India needs positive change in agricultural sector. Therefore, in the 11th Five Year Plan, the National Development Council has adopted a 14 point resolution dividing responsibilities equally between the Central and the state governments with an aim to achieve four percent agricultural growth by the end of 11th plan (see Box 1). The agricultural sector has been allocated additional Rs. 25,000 crore from the Central government in the next four years.

Declining Investment and Rising Subsidies

One of the important reasons for deceleration in agricultural growth has been declining levels of investment in agriculture and allied sectors and irrigation (Table 1). As Table 1 illustrates, share of agriculture and irrigation in total plan expenditure has declined from 37.3 percent in First Five Year Plan to 10.6 percent in 10th Five Year Plan (Figure 5). In the 6th Plan additional head of rural development was introduced and its share in total

plan expenditure has increased over the years from 6.4 percent in 6th Plan to 9.5 percent in 9th plan and then slightly declined to nearly 8 percent in 10th plan.

Figure 4. Plan-wise Trend of Growth of Total GDP and Agriculture GDP (including Allied Sectors) at 1993-94 constant Prices



Source: CSO (2007)

Box 1. 14-Point Action Plan for Centre and States

Action Plan for the Central Government

1. A new Food Security Mission aimed at an additional production of wheat of eight million tones, rice 10 million tones and pulses two million tones
2. A new additional Central assistance to incentivise states to draw up plans considering region-specific plans taking into account agro-climatic conditions, natural resources and technology
3. Additional resources to improve irrigation including component for modernization and canal command area
4. Giving scientific input a new direction, additional funding will be provided to support regionally focused research projects in State Agricultural Universities

Action Plan for the State Governments

1. State will have to formulate district level plans every year to avail the Rs. 25,000 crore scheme announced by Govt. of India
2. Each state will have a State agricultural plan aimed to achieve the state specific growth target
3. Special efforts to complete all projects under different Central Government schemes with improvement in water management
4. Availability of better quality seeds to farmers will have to prioritize to reduce yields gaps. In this State Agricultural Universities will play an important role

5. Instead of year wise funding by National Bank for Agriculture and Rural Development (NABARD), the government will adopt state-wise funding keeping in mind the states with low credit deposit ratios	5. Revamp state agricultural extension system that includes universities and krishi gyan/vigyan kendras
6. Fertilizer subsidy will be restructured for easy delivery to the farmers. Subsidy for balanced plant nutrition would be provided	6. Implementation of Vaidyanathan Committee recommendations on rural cooperative credit and deadlines to meet the comments
7. The government will take steps to improve skills of people employed in farm and non-farm sector in rural areas	7. Notify amendments in Agricultural Produce Market Committee Act to allow variety of market tools including contract and cooperative farming

Source: *Hindustan Times, New Delhi, Wednesday, May 30, 2007*

Table 1. Plan Expenditure on Agriculture and allied Sectors, Irrigation, and Rural Development (Rs. crore)

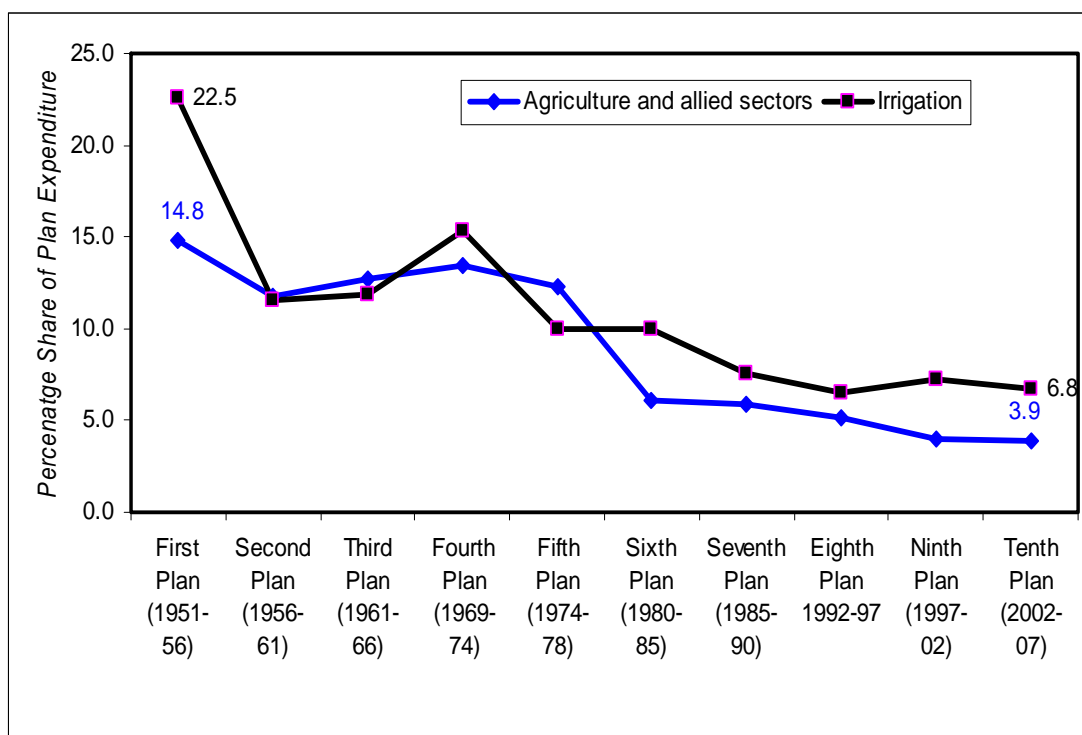
	Total plan Expend.	Agri. & allied sectors	Irrigation	Rural Development	Share of agri. & irrigation in total plan expenditure
I Plan (1951-56)	1960	289.9	441.8	-	37.3
II Plan (1956-61)	4671.8	549	541.6	-	23.3
III Plan (1961-66)	8576.5	1088.9	1019.1	-	24.6
IV Plan (1969-74)	15778.8	2120.4	2415.7	-	28.7
V Plan (1974-78)	39426.2	4864.9	3925.8	-	22.3
VI Plan (1980-85)	109291.7	6623.5	10929.9	6996.8	16.1
VII Plan (1985-90)	218729.6	12792.6	16589.9	15246.5	13.4
VIII Plan (1992-97)	485457.2	24895.7	31398.9	40372.1	11.6
IX Plan (1997-02)	941041	37239	67875	88965	11.2
X Plan (2002-07)	1525639	58933	103315	121928	10.6

Source: *Gol (2001) (Indian Planning Experience - A Statistical Profile Planning Commission, Government of India, New Delhi, January 2001 & 10th Five Year Plan (2002-2007)*

The share of public sector in gross capital formation in agriculture has declined during the last decade from 30.9 percent in 1995-96 to 25.6 percent in 2003-04, while share of private sector has increased from 69.1 percent to 74.4 percent during the same period (Figure 6). However, due to high degree of complementarity between public and private

investment in agriculture, there is a need to increase public investment. The share of agriculture sector's capital formation in GDP has declined from 1.9 percent in the early 1990s to about 1.2 in the early 2000s, which is a cause of concern. However, there is an indication of reversal of this trend of late, with the public sector investment in agriculture reaching the highest level since the early 1990s at Rs. 5,249 crore in 2003-04 at 1993-94 prices (GoI, 2007). This has helped in improving the share of agriculture sector's capital formation in GDP from 1.28 percent in 2001-02 to 1.31 percent in 2003-04.

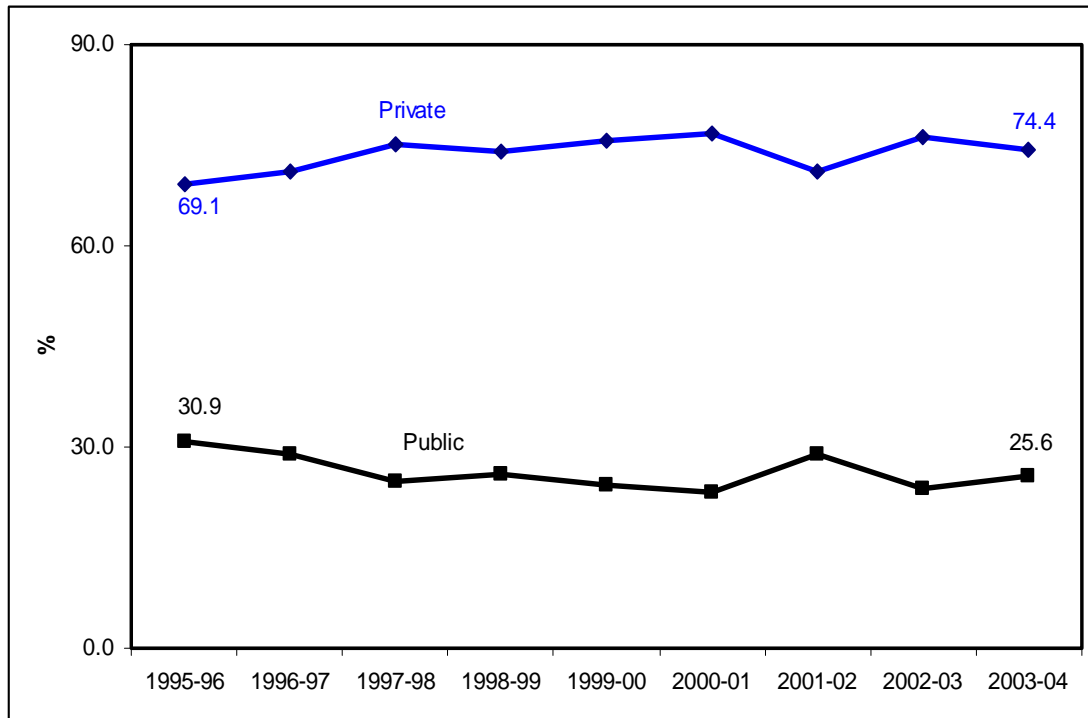
Figure 5. Share (%) of Agriculture and allied Sectors, and Irrigation in Total Plan Expenditure during Plan Periods



Source: GoI (2001), *Indian Planning Experience: A Statistical Profile* Planning Commission, New Delhi, January 2001 & 10th Five Year Plan (2002-2007)

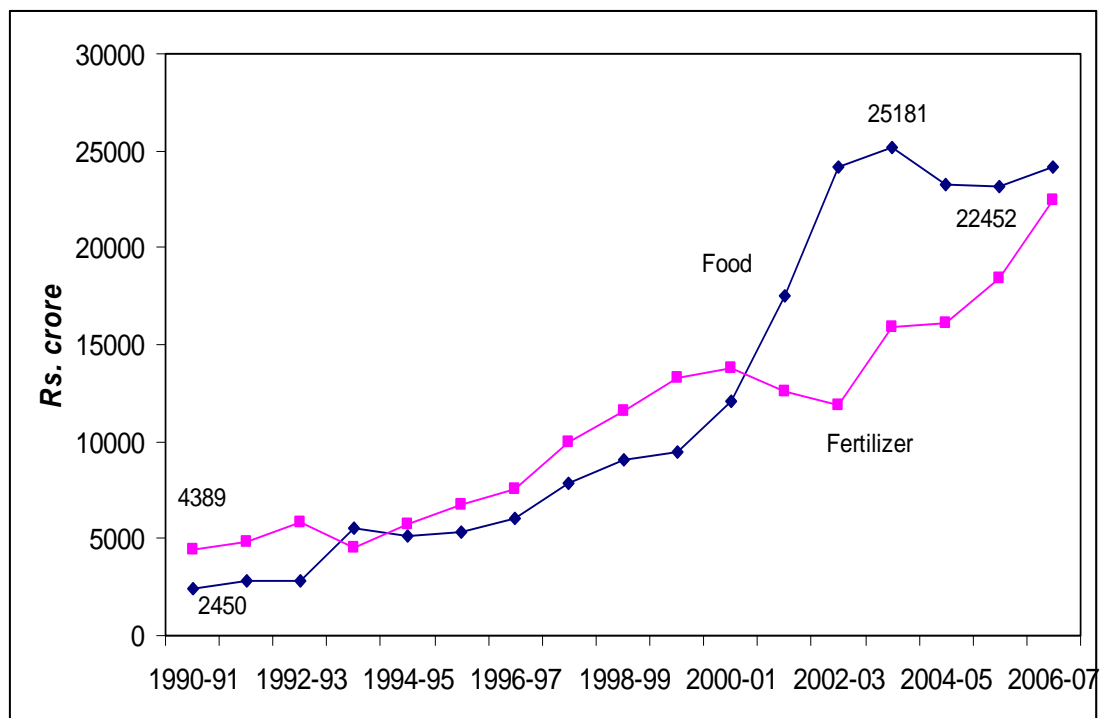
A key reason for declining public investment in agriculture has been ever increasing agricultural subsidies such as fertilizers, power, irrigation, food, etc. Total agricultural subsidies have increased at an annual compound growth rate of about 12 percent between 1993-94 and 2002-03 (Rs. 14,069 crore in 1993-94 to about Rs. 36,514 crore). The share of fertilizer subsidies in total agricultural subsidies is about 36 percent (GOI, 2007). Trends in food and fertilizer subsidies during the 1990s and 2000s are presented in Figure 7. The amount of subsidy on fertilizers has increased from Rs. 4389 crore in 1990-91 to about Rs. 22,452 crore in 2006-07 (at an annual compound growth rate of 10.6%). Food subsidies have also witnessed a significant increase during the 1990s and 2000s, rising from Rs. 2450 crore in 1990-91 to Rs. 25,181 crore in 2003-04 and then marginally declined to Rs. 24,200 crore in 2006-07. The amount of food and agricultural subsidies is greater than public investment in agriculture and allied sector, irrigation and rural development combined. In addition there has been deterioration of institutions/ organizations providing inputs and services such as credit, seeds, technology, extension, to agricultural sector.

**Figure 6. Share of Public and Private Sector in Investment in Agriculture
(at 1993-94 prices); 1995-96 to 2003-04**



Source: Govt. of India (2007)

Figure 7 Trends in Food and Fertilizer Subsidies in India



Source: Economic Survey 2006-07

Land Fragmentation

The agrarian structure in India has undergone significant structural transformation since the 1970s. Recent data shows that the share of marginal and small farmers (farmers owning from 0.1 to less than 2 ha) increased from 69.7 percent in 1970-71 to approximately 82 percent in 2000-01 (Table 2). The share of small and marginal farmers in total area operated also increased from about 21 percent in 1970-71 to about 39 percent in 2000-01. The average farm size has declined from 2.3 ha in 1970-71 to 1.41 ha in 1995-96 and 1.32 ha in 2000-01. The average size of land holdings in India is very small and is subject to fragmentation, due to imposition of ceiling on land owned, population increase, inheritance laws which have stipulated an equal division of property among sons, lack of off-farm occupations, etc. Such small holdings are often over-manned, resulting in disguised unemployment and low productivity of labor. Moreover, there are several tenancy restrictions in many states. These restrictions range from a complete ban in some States to complete freedom of leasing in some States. There is growing consensus about the need to have a re-look at current tenancy legislations, which sometimes restrict participation of private sector in agriculture. However, under the Indian Constitution, land administration falls under the State governments, hence large variations across states.

Table 2. Distribution of Operational Holdings in India; 1970-71 to 2000-01

<i>Category</i>	<i>1970-71</i>	<i>1980-81</i>	<i>1985-86</i>	<i>1990-91</i>	<i>1995-96</i>	<i>2000-01</i>
<i>Number ('000)</i>						
Marginal (<1 ha)	35682 (50.6)	50122 (56.4)	56147 (57.8)	63389 (59.4)	71179 (61.6)	76122 (63.0)
Small (1.0-2.0 ha)	13432 (19.1)	16072 (18.1)	17922 (18.4)	20092 (18.8)	21643 (18.7)	22814 (18.9)
Semi-medium (2.0-4.0 ha)	10681 (15.2)	12455 (14.0)	13252 (13.6)	13923 (13.1)	14261 (12.3)	14087 (11.7)
Medium (4.0-10.0 ha)	7932 (11.3)	8068 (9.1)	7916 (8.1)	7580 (7.1)	7092 (6.1)	6568 (5.4)
Large (>10 ha)	2766 (3.9)	2166 (2.4)	1918 (2.0)	1654 (1.6)	1404 (1.2)	1230 (1.0)
Total	70493 (100.0)	88883 (100.0)	97155 (100.0)	106637 (100.0)	115580 (100.0)	120822 (100.0)
<i>Area ('000 ha)</i>						
Marginal (<1 ha)	14545 (9.0)	19735 (12.0)	22042 (13.4)	24894 (15.0)	28121 (17.2)	30088 (18.82)
Small (1.0-2.0 ha)	19282 (11.9)	23169 (14.1)	25708 (15.6)	28827 (17.4)	30722 (18.8)	32260 (20.18)
Semi-medium (2.0-4.0 ha)	29999 (18.5)	34645 (21.2)	36666 (22.3)	38375 (23.2)	38953 (23.8)	38305 (23.96)
Medium (4.0-10.0 ha)	48234 (29.8)	48543 (29.6)	47144 (28.6)	44752 (27.0)	41398 (25.3)	38125 (23.84)

Large (>10 ha)	50064 (30.9)	37705 (23.0)	33002 (20.1)	28659 (17.3)	24163 (14.8)	21124 (13.21)
Total	162124 (100.0)	163797 (100.0)	164562 (100.0)	165507 (100.0)	163357 (100.0)	159903 (100.0)
<i>Average size of operational holding (ha)</i>						
Marginal (<1 ha)	0.41	0.39	0.39	0.39	0.40	0.40
Small (1.0-2.0 ha)	1.44	1.44	1.43	1.43	1.42	1.41
Semi-medium (2.0-4.0 ha)	2.81	2.78	2.77	2.76	2.73	2.72
Medium (4.0-10.0 ha)	6.08	6.02	5.96	5.09	5.84	5.80
Large (>10 ha)	18.1	17.41	17.21	17.33	17.21	17.18
Total	2.3	1.84	1.69	1.57	1.41	1.32

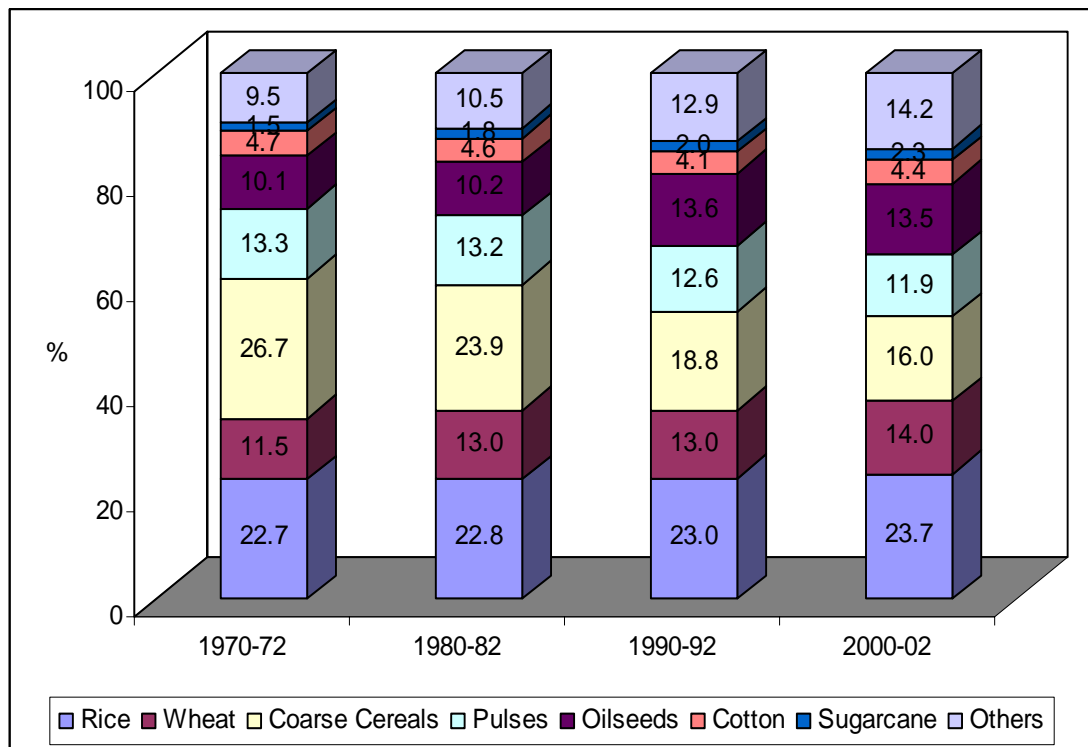
Source: GoI (2007)

Cropping Pattern Shifts and Stagnant Productivity Levels

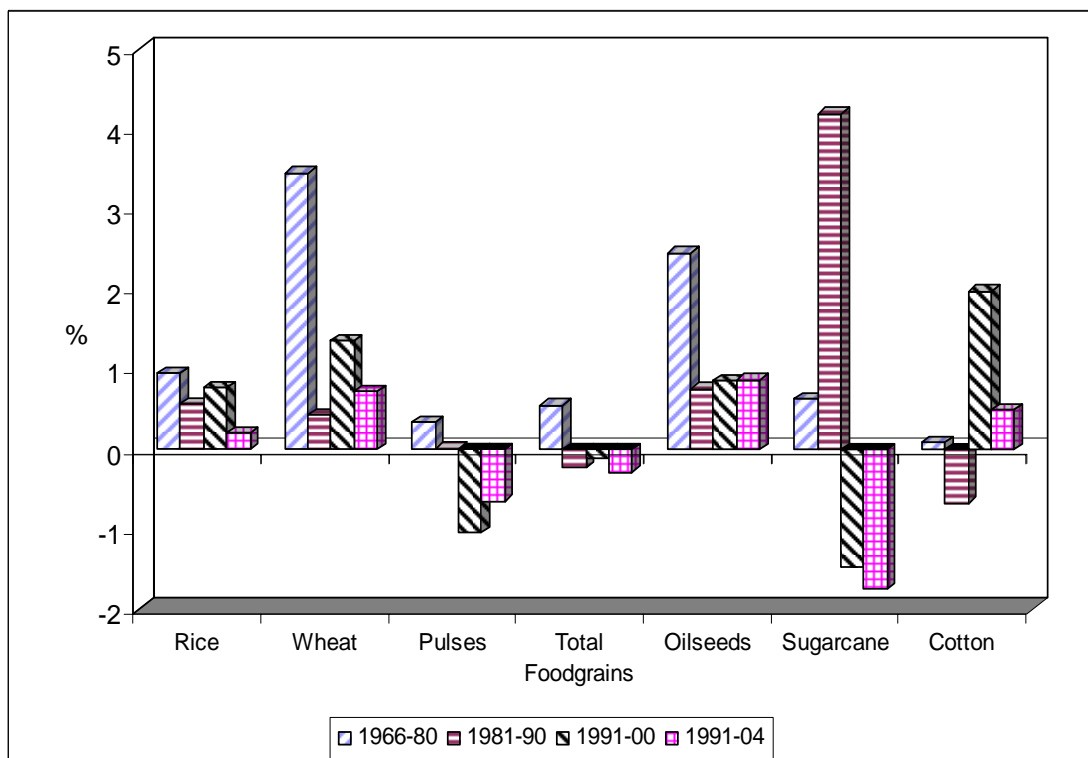
Foodgrains continue to occupy important place in the Indian agriculture, commercial crops such as fruits and vegetables, fibres and condiments and spices, etc. have gained significant share in crop portfolio during the last decade. The share of foodgrains in total cropped area has declined from about 77 percent in 1970-72 to about 65.6 in 2000-02 (Figure 8). The area under rice has remained almost constant at about 23 percent of total cropped area while area under wheat has increased from 11.5 percent to 14 percent during the same period. However area under coarse cereals has declined significantly from about 27 percent in 1970-72 to 16 percent in 2000-02. The area under pulses has also declined from 13.3 percent to nearly 12 percent during the period. The area under other crops mainly under fruits and vegetables, fibres and condiments and spices has increased during the last decade.

The rate of growth in agriculture has become stagnant and productivity growth has also become stagnant. Trends in growth rates of production and yield of principal crops at all-India level during the post-green revolution period (1966-67 to 2004-05) are presented in Figure 9 and 10. In case of production, pulses experienced a significant negative growth rate during the 1980s and 1990s and this decline was due to decline in both area and productivity. There was significant shift in area from pulses to superior cereals like wheat and rice and also non-foodgrain crops mainly fruits and vegetables. Growth rates of production for most of crops were significantly lower during the period 1991-92 to 2004-05 compared with 1970s and 1980s. Decline in production growth was due to lower growth in productivity levels of most foodgrain crops.

The above results clearly show that performance of agriculture particularly in case of wheat, coarse cereals, pulses and oilseeds has decelerated during the last decade, which is a cause of concern. Therefore, improving agricultural performance and sustaining it over longer term remains the key priority for the government.

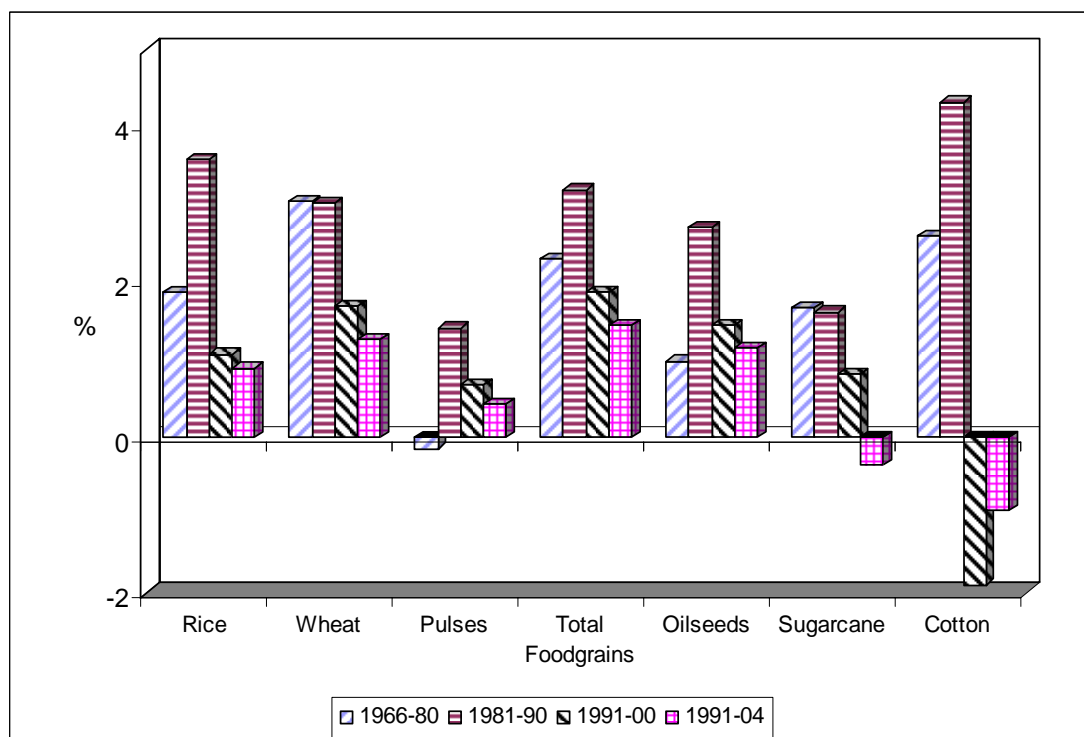
Figure 8. Shifts in cropping pattern in India, 1970-72 to 2000-02

Source: Govt. of India, Ministry of Agriculture, Agricultural Statistics at a Glance (various issues)

Figure 9. Growth rates of Production of Principal Crops in India 1966-67 to 2004-05

Source: Computed based on data obtained from Agricultural Statistics at a Glance (various issues)

Figure 10. Growth Rates of Productivity of Principal Crops in India, 1966-67 to 2004-05

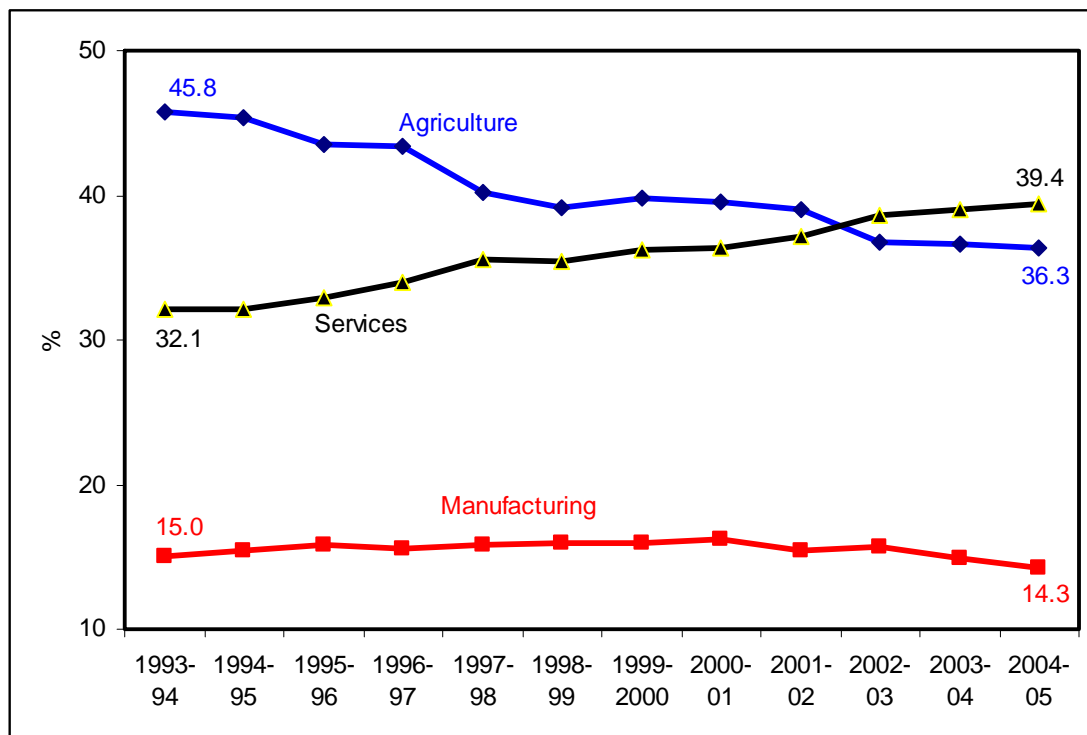


Source: Computed based on data obtained from *Agricultural Statistics at a Glance* (various issues)

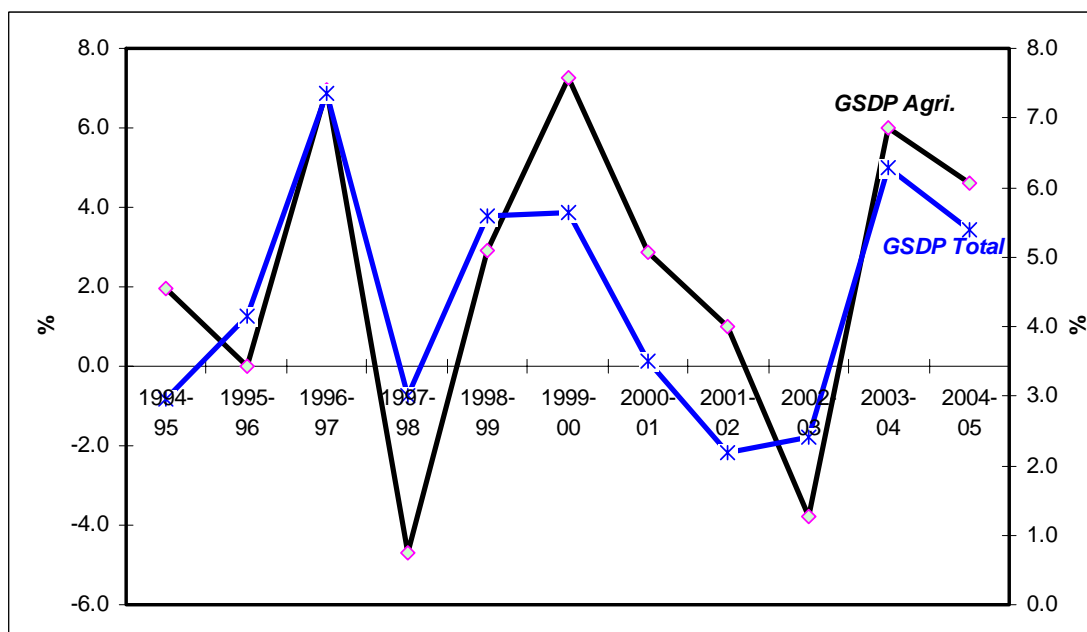
Section II: Emerging Agrarian & Ecological Crisis in Punjab

There has been a structural transformation in the Punjab economy during the last few decades. However, agriculture sector still continues to play an important role in the State economy in spite of the fact that the share of this sector in Gross State Domestic Product (GSDP) is continuously declining. The composition of Gross State Domestic Product at 1993-94 constant prices reveals that the share of agriculture has declined from 45.8 percent in 1993-94 to 36.3 percent in 2004-05 (Figure 11), which is much higher than national average of 20.5 percent. However, in absolute term GSDP from agriculture has increased from Rs. 1385.36 crore to Rs. 1914.57 crore at an annual compound growth rate of nearly 2 percent. The share of manufacturing sector has marginally fallen from 15 percent to 14.3 percent, while share of services sector has significantly increased from 32.1 percent to 36.3 percent during the same period.

Agriculture sector occupies a significant position in the State economy as nearly two-third of population lives in rural areas and is mainly dependent on agriculture. Therefore, agricultural sector has significant influence on the overall growth of the State economy. For example, in six out of 11 years (1994-95 to 2004-05) agricultural GSDP witnessed a lower growth compared to the previous year and this lower growth pushed the overall economic growth to the lower side. Figure 12 shows a relationship between growth in agricultural GSDP and total GSDP in Punjab State. It is evident from the Figure that overall economic growth in the State is closely associated with agricultural growth. Since agricultural sector has significant influence on the State economy and is important from socio-economic development point of view, there is a need to continuously accord top priority to agricultural sector.

Figure 11 Share of agriculture in State's GDP, 1993-94 to 2004-05 (1993-94 prices)

Source: CSO, National Accounts Statistics (2007 and back issues)

Figure 12. Relationship between growth (% increase over the previous year) in Gross State Domestic Product (GSDP) from Agriculture and Total GSDP in Punjab, 1994-95 to 2004-05 (1993-94 prices)

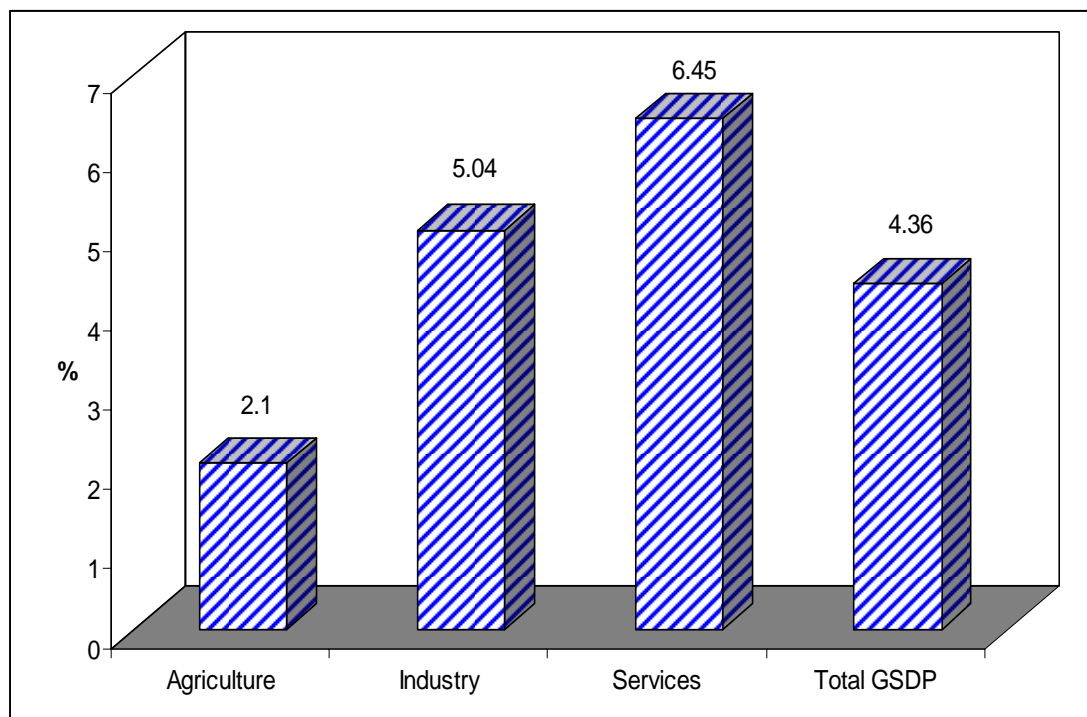
Source: CSO (2007)

Slow Growth in Agriculture

Concern over the slow pace of agricultural growth at national as well as State level is increasing. Contrary to government targets, the rate of growth of agricultural sector decelerated during the period 1993-94 and 2004-05. The sector grew at an average annual

rate of 2.1 percent from 1993-94 to 2004-05. This decline is in contrast to industry and services sectors, which grew at 5.04 and 6.45 percent per year respectively from 1993-94 to 2004-05 (Figure 13).

Figure 13. Growth Rates in Agriculture, Industry, Services and Total GSDP in Punjab: 1993-94 to 2004-04 (at 1993-94 constant prices)

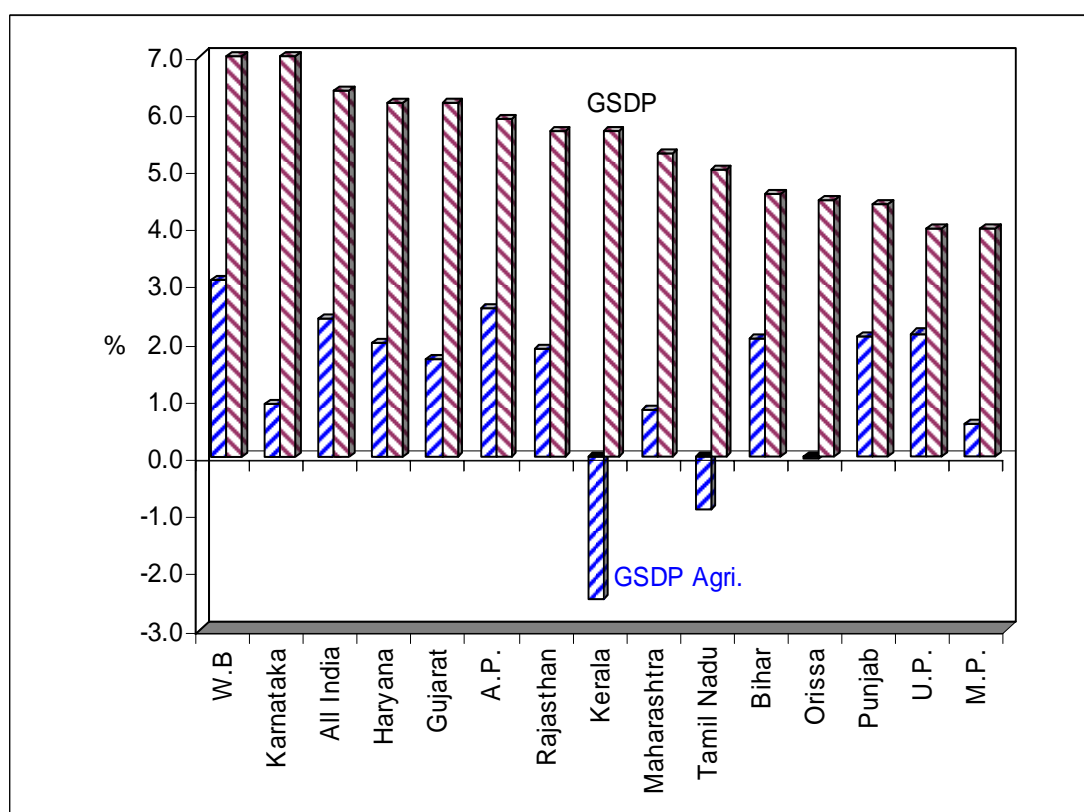


Source: CSO, *National accounts Statistics (2007 and back issues)*

Punjab's agricultural growth one of the highest in 1970s and 1980s, has been below national average during the 1990s and 2000s. Agricultural growth in Punjab declined to nearly 2.2 percent from mid-1990s. Since agriculture still constitutes about 36 percent of Punjab's State Domestic Product (as against 20% at all India level), slow agricultural growth has resulted in overall economic decline in the State. Punjab's GSDP growth rate was the third lowest among major States, above only Uttar Pradesh and Madhya Pradesh (Figure 14). Agriculture growth rate was below the national average as well as States like West Bengal, Andhra Pradesh and Uttar Pradesh. Keeping in view importance of agriculture in Punjab's economy, it would be difficult to achieve higher growth without strong agricultural performance.

Majority of States in which dependence on agriculture is high witnessed a lower growth in agriculture. Weak agricultural performance, especially among the poorest states like Orissa, Bihar, Rajasthan, makes it more difficult to reduce income disparities. Similarly, poor performance of agricultural sector in States like Punjab and Haryana, where agriculture contributes significantly (about 1/3rd) to GSDP, amplifies the magnitude of challenge of achieving the overall economic development. Table 3 illustrates the wide disparity in performance of both agricultural and allied sector and overall GDP growth across major States from 1993-94 to 2004-05. Except for Andhra Pradesh and West Bengal, agricultural GDP in most states grew at the rate of less than 2.5 percent per year during the last 10 years. Of great concern are the States with highest concentration of the poor like Bihar and Orissa as well high dependence on agriculture in States like Punjab and Haryana (Table 4).

Figure 14 Growth Rate in GSDP and GSDP from Agriculture in Selected States between 1993-94 and 2004-05 (1993-94 Prices)



Source: Calculated based on data obtained from CSO, National Accounts Statistics (2007 and back issues)

Table 3. State Classification by Agricultural and allied sectors GDP and total GDP Growth Rates, 1993-94 to 2004-05

	<i>GDP Growth Rate $\geq 6\%$</i>	<i>GDP Growth Rate $< 6\%$</i>
<i>GDP Agri. Growth Rate $\geq 2.4\%$</i>	West Bengal	Andhra Pradesh
<i>GDP Agri. Growth Rate $\leq 2.4\%$</i>	Gujarat, Haryana, Karnataka	Bihar, Kerala, Orissa, Maharashtra, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh

Source: Calculated based on data obtained from CSO, National Accounts Statistics (2007 and back issues)

Table 4. Association between Share of Agriculture in GDP and average annual growth rate in GDP from Agriculture and Allied Sector during 1993-94 and 2004-05 (1993-94 Prices)

	<i>High dependence on Agriculture (>20% share in GDP)</i>	<i>Low dependence on Agriculture (<20% share in GDP)</i>
<i>High Growth in Agriculture ($\geq 2.5\%$)</i>	Andhra Pradesh (2.6%) West Bengal (3.1%)	Kerala (-2.5%)
<i>Low growth in Agriculture (<2.5%)</i>	Punjab (2.1%), Bihar (2.1%) Haryana (2.0%), Orissa (-0.02%), Madhya Pradesh (0.6%), Rajasthan (1.9%) Uttar Pradesh (2.2%)	Gujarat (1.7%) Karnataka (0.9%) Maharashtra (0.8%) Kerala (-2.5%) Tamil Nadu (-0.9%)

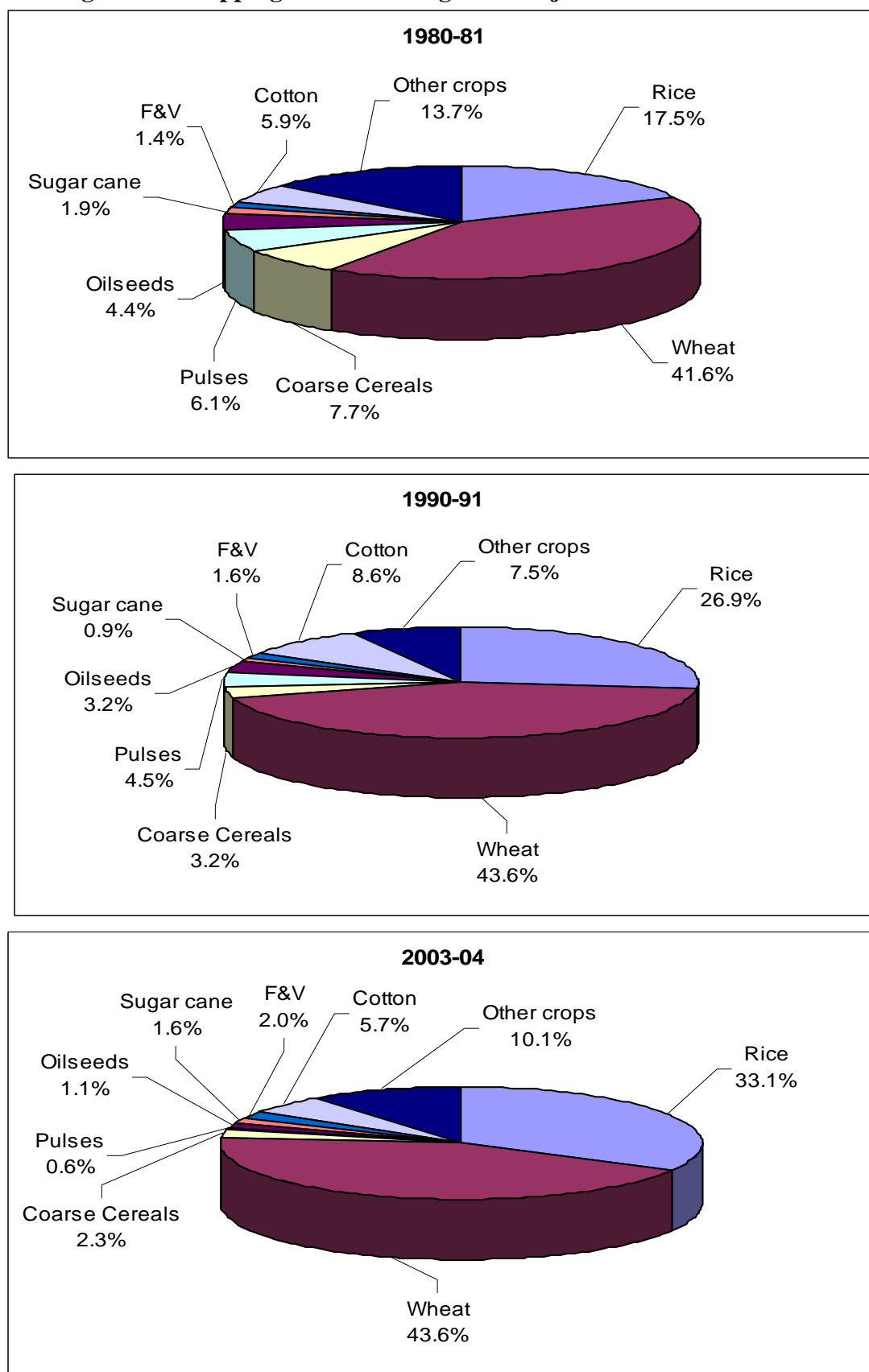
Source: Calculated based on data obtained from CSO, National Accounts Statistics (2007 and back issues)

Dominance of Rice-Wheat Cropping System

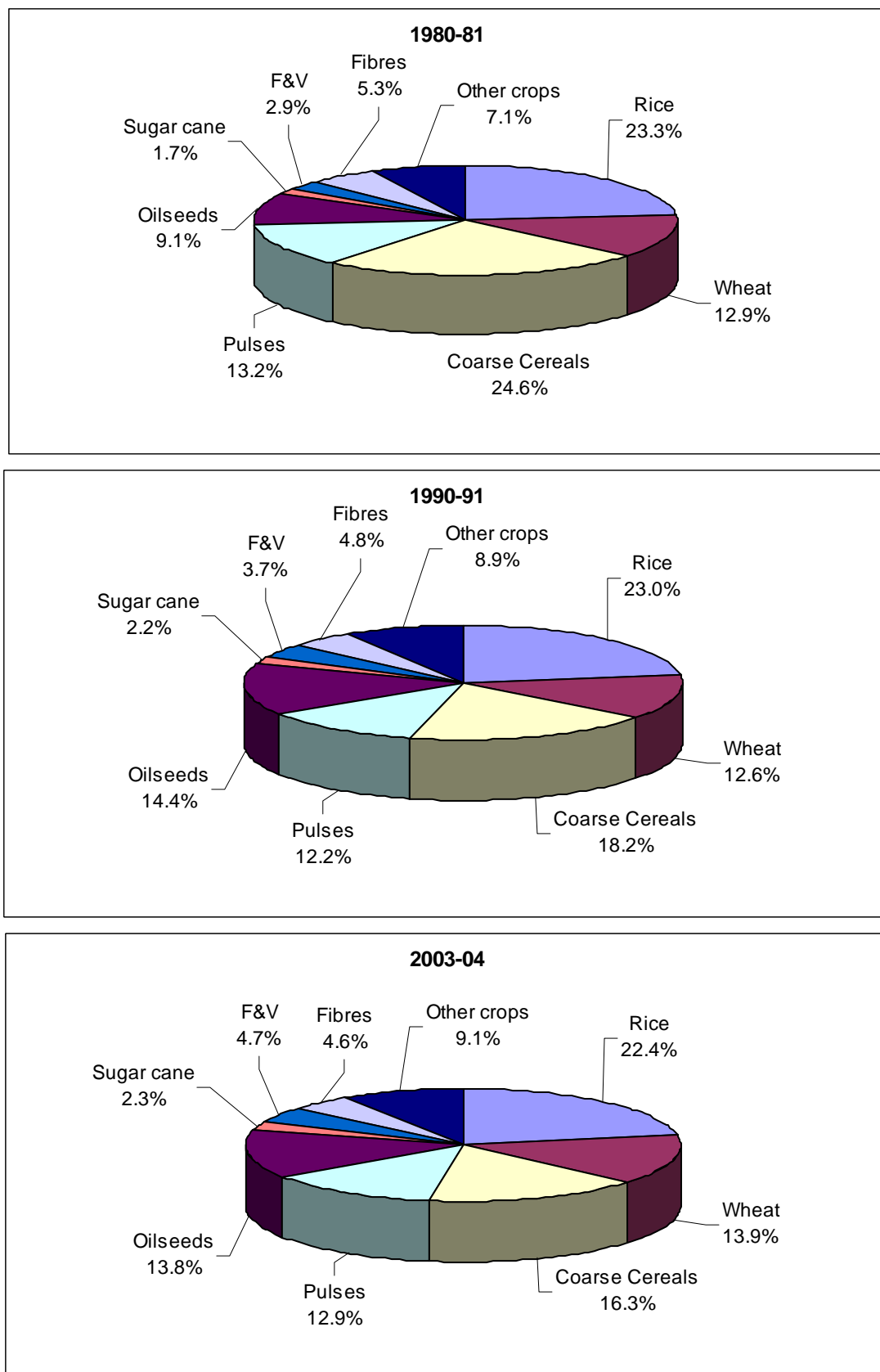
The total cropped area in Punjab which was 5.678 million hectares in 1970-71 has increased to 7.941 million hectares in 2000-01. The total cropped area has remained almost constant during the 2000s, while net sown area in the State has declined from about 4.25 million ha in 2001-02 to 4.20 million ha in 2004-05 due to diversion of productive land to non-agricultural uses. The cropping intensity in Punjab has increased from 140 in 1970-71 to about 189 in 2004-05 as against national average of about 133 percent.

The share of foodgrains in total cropped area has increased from about 73 percent in 1980-81 to 79.6 percent in 2003-04 (Figure 15), while at all India level the share of food grains in total cropped area has declined from 74 percent to 65.5 percent during the same period (Figure 16). Rice and wheat are two important food crops grown in the state and account for more than three-fourth of total cropped area. Pulses account for less than one percent of acreage. In 1980-81, the share of rice in total cropped area was 17.5 percent, wheat accounted for 41.6 percent and coarse cereals occupied 7.7 percent of area. There has been a significant increase in area under rice at the expense of coarse cereals, pulses and oilseeds. The area under rice increased to 33.1 percent and wheat to 43.6 percent in 2003-04 while share of coarse cereals declined to 2.3 percent and pulses to less than one percent.

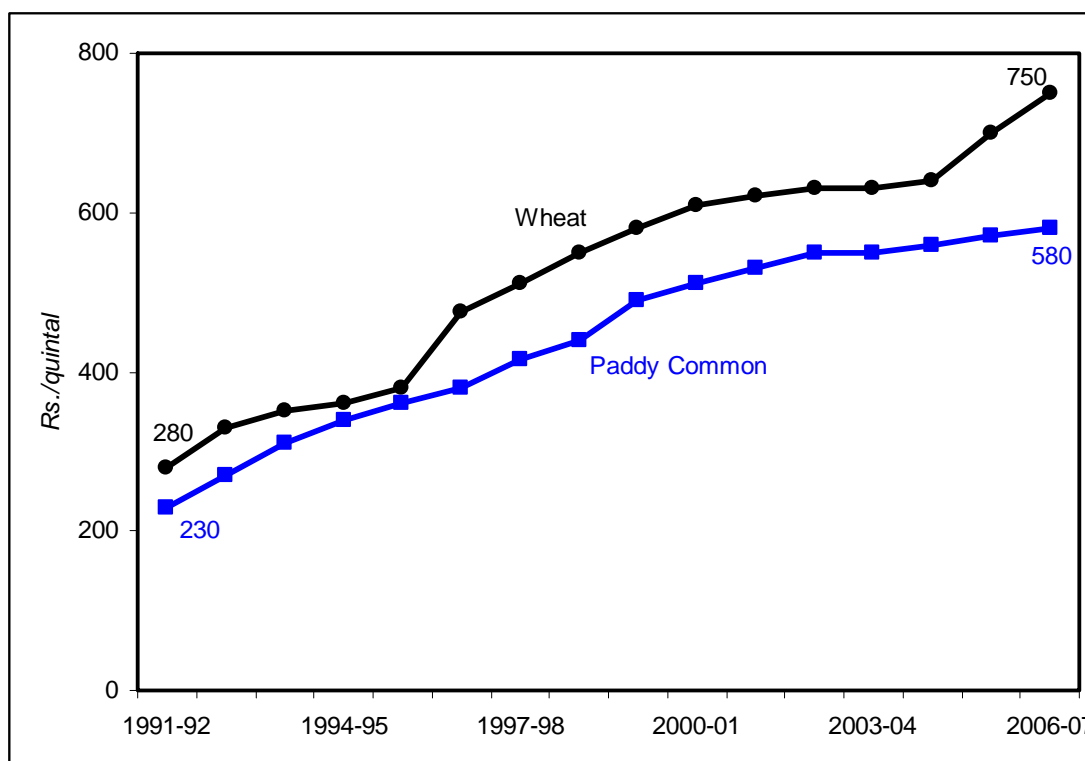
Main reasons for increase in area under rice and wheat in the State are steady increase in Minimum Support Prices (MSP) of wheat and rice, especially during the 1990s and assured procurement by the government. MSP of wheat has increased from Rs. 280 per quintal in 1991-92 to Rs. 750 per quintal in 2007-08 and in case of rice (common variety) it has increased from Rs. 230 to Rs. 580 per quintal during the same period (Figure 17).

Figure 15. Cropping Pattern Changes in Punjab: 1980-81 and 2003-04

Source: Calculated based on data obtained from Agricultural Statistics at a Glance 2006 and back issues

Figure 16. Cropping Pattern Changes in India: 1980-81 and 2003-04

Source: Calculated based on data obtained from Agricultural Statistics at a Glance 2006 and back issues

Figure 17. Minimum Support Prices of Wheat and Rice in India: 1991-92 to 2006-07

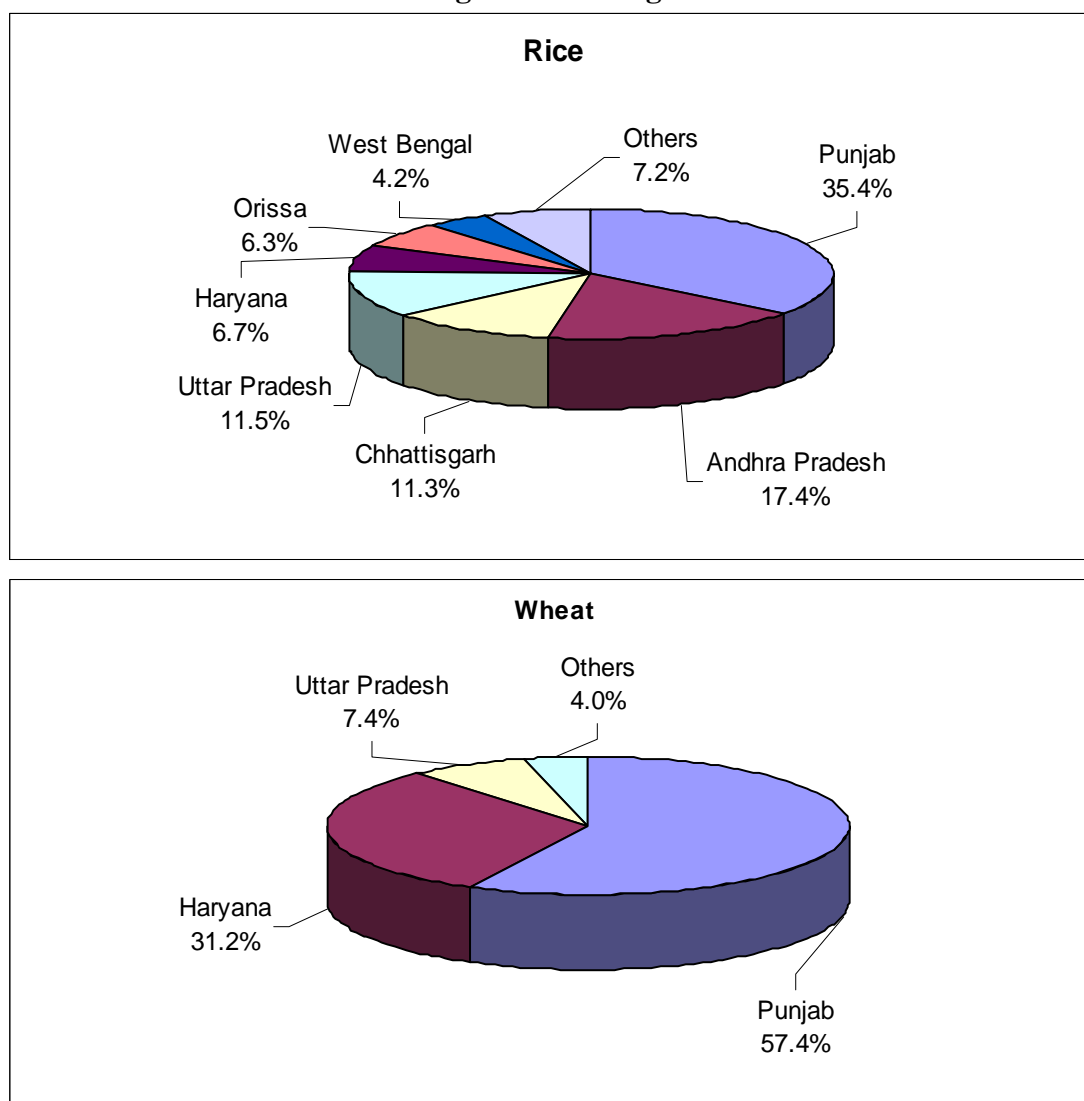
Source: GoI (2007)

Punjab has become a breadbasket of India, contributing about 35 percent of rice and 57.4 percent of wheat procured by the Food Corporation of India during the triennium ending 2005-06 (Figure 18). Rice production in the State has increased 15 fold from 688 thousand metric tons in 1970-71 to 10,437 thousand metric tons and wheat production has increased from 5145 thousand tones to 14,695 thousand tones in 2004-05 (almost threefold). However, continuous cultivation of rice-wheat cropping system has created many agro-ecological crisis in the state, which are discussed in the next section.

Stagnant/Declining Crop Yields

The average yields in Punjab are much higher than all-India average. The average yield of rice in Punjab is around 3.9 t/ha, almost twice the national average and average productivity of wheat is about 4.2 t/ha compared with national average of about 2.6 t/ha. Increases in crop productivity in the State have come from the intensification of agricultural production and adoption of yield enhancing technologies, especially modern high-yielding varieties and fertilizers in late 1960s. However, there are indications that per hectare yield of wheat has been falling in Punjab for the past few years. In 1999-2000, per hectare average yield of wheat was about 4.7 t/ha and it declined to about 4.2 tonnes per hectare in 2005-06 (Figure 19). In case of rice, the yield has stagnated at about 3.1 to 3.3 t/ha during the 1990s but marginally improved during the 2000s. Yield of wheat and rice have also reached a plateau at all-India level. Stagnating productivity and production of rice and wheat in Punjab and indications that yields are declining/stagnant in rice-wheat rotation, concerns about sustainability of this cropping system are being raised. Declining/stagnating productivity trends can be directly linked to the ecological consequences of intensive monoculture systems, including the buildup of soil salinity, waterlogging, declining soil fertility, increased soil toxicity, and increased pest populations, particularly soil pests, etc.

Figure 18. State-wise Share in Procurement of Rice and Wheat in Major Rice and Wheat Producing States during the TE 2005-06

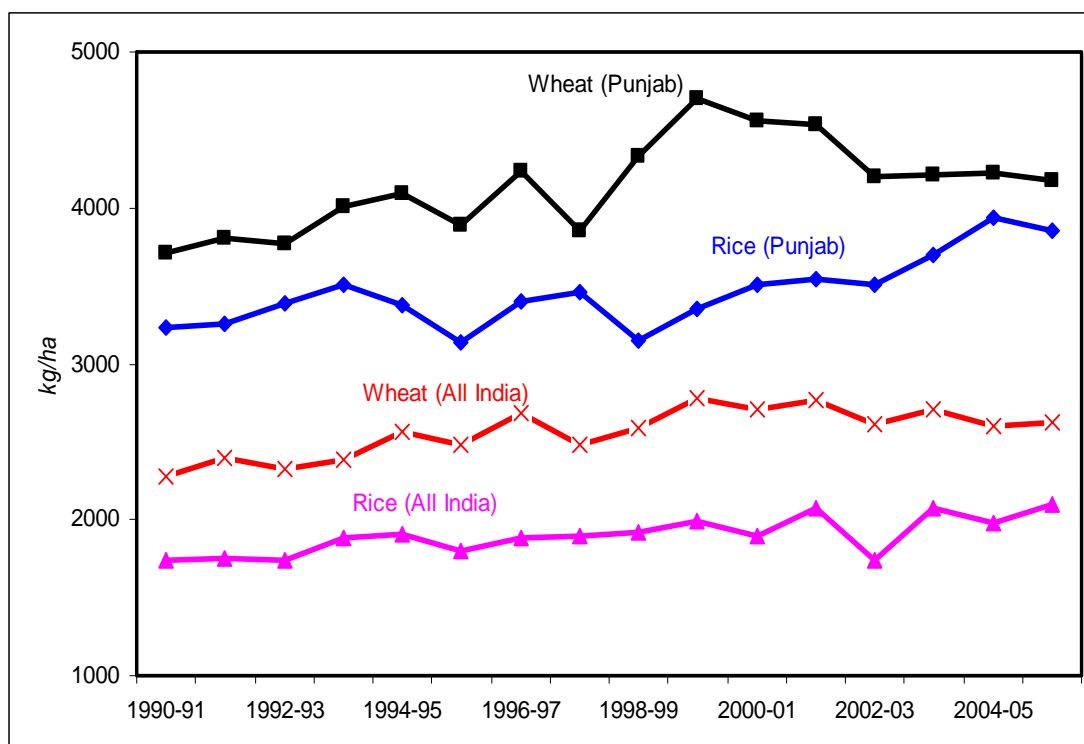


Source: Govt. of India, Economic Survey 2006-07

Ecological Crisis

For a state that spearheaded the Green Revolution in the 1960s and 1970s, Punjab today is facing a major crisis on the agricultural front. With introduction of high yielding varieties (HYVs) during the green revolution period and assured market and price for marketable surplus, rice-wheat crop rotation became dominant in Punjab. The HYVs require assured supplied of irrigation water, large amounts of chemical fertilizers, and pesticides, which have long-term ecological consequences. Rice is highly water-intensive crop and requires large quantity of water. About 73 percent of irrigation in the State is supplied from tubewells and remaining from government canals.

Figure 19. Trends in Yield of Rice and Wheat in Punjab and All-India: 1990-91 to 2005-06



Source: GoI (2007) *Agricultural Statistics at a Glance 2006*

Groundwater Over-exploitation

With paddy and wheat being heavily water dependant crops, farmers have every reason to over-exploit groundwater. The inevitability of groundwater extraction has been politically exploited too. Successive governments in the recent past have even given free electricity to the farmers in the state. The water tables have fallen at alarming rates in many places in the State during the last few decades. The government's policy of providing free electricity for agriculture and very low water charges for canal water have encouraged inefficient use of irrigation water. Intensive use of tubewell irrigation has led to depletion of water resources in the State. As illustrated in Table 5, about 98 percent of groundwater resources in the State have already been exploited. Nearly 59 percent of blocks in the State have overexploited groundwater resources, the highest rate in the country and another 12 percent are in dark/critical zone. On the other hand injudicious use of canal-irrigation water without regard to soil conditions and inadequate attention to drainage, have led to the emergence of conditions of water-logging and salinity in many areas, resulting in valuable agricultural land going out of use in the State.

High and Imbalance Use of Fertilizers

There has been a substantial increase in fertilizer consumption in Punjab in the last three decades. Total NPK (N, P₂O₅ and K₂O) consumption has increased more than seven-fold (from 213 thousand tones to 1687 thousand tones) between 1970-71 and 2005-06 (Figure 20). Per hectare fertilizer consumption increased from about 37 kg to 221.7 kg in the same period. The fertilizer consumption in Punjab is the highest in India (Figure 21). In addition, overuse of nitrogenous fertilizers due to higher amounts of subsidy on Urea has led to imbalanced use of fertilizers in the State. The N:P₂O₅:K₂O ratio in Punjab is one of

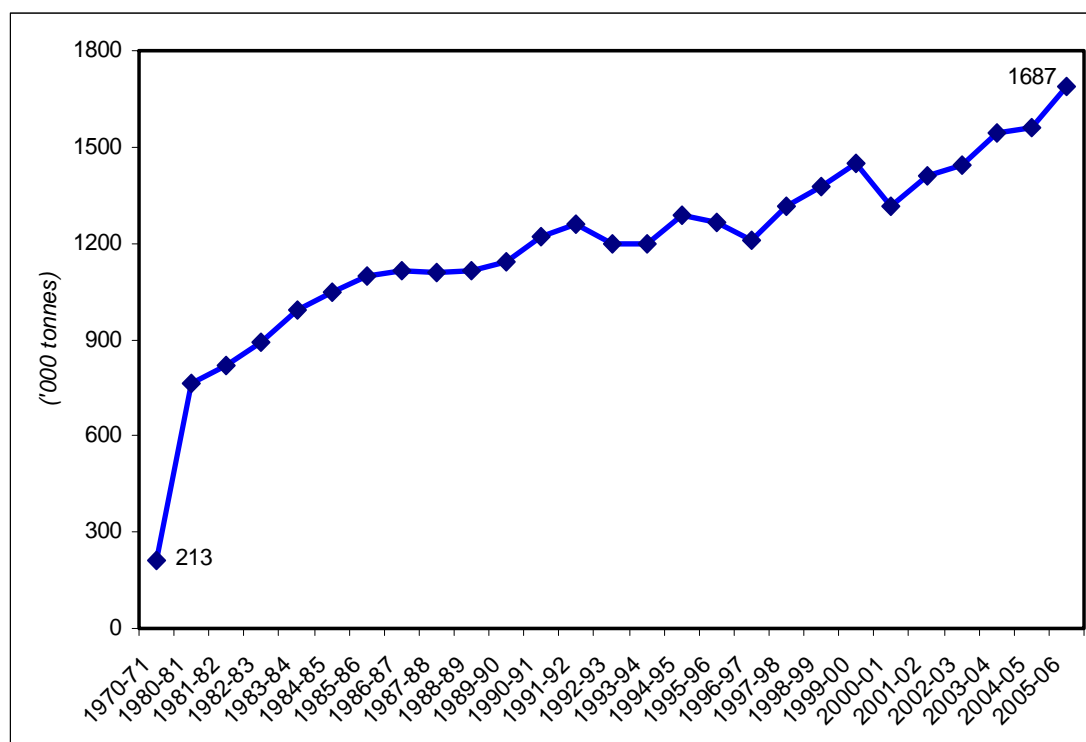
the most distorted at 27.8:7.3:1 as against the generally recommended 4:2:1 ratio (Table 6).

Table 5. Groundwater Resources Development in selected States of India

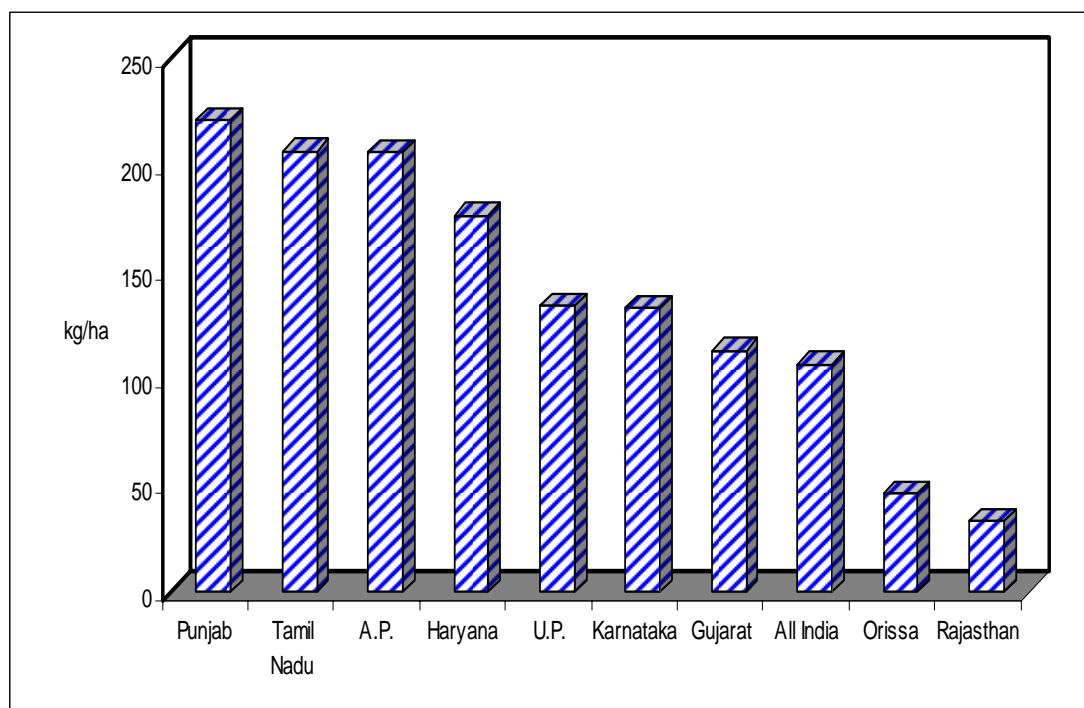
State	Groundwater development (%)	Number of blocks	
		overexploited	Dark/Critical
Andhra Pradesh	25.86	118 (10.20)	79 (6.83)
Bihar	46.33	6 (1.52)	14 (3.55)
Gujarat	55.16	41 (22.78)	19 (10.56)
Haryana	112.18	30 (27.03)	13 (11.71)
Karnataka	34.60	7 (4.00)	9 (5.14)
Kerala	22.17	3 (1.99)	6 (3.97)
Madhya Pradesh	27.09	2 (0.64)	1 (0.32)
Maharashtra	37.04	154 (6.65)	72 (3.11)
Punjab	97.66	81 (58.70)	12 (8.70)
Rajasthan	86.42	86 (36.29)	80 (33.76)
Tamil Nadu	64.43	138 (35.84)	37 (9.61)
Uttar Pradesh	46.89	2 (0.24)	20 (2.44)
West Bengal	38.19	0	61 (22.18)
All India	41.57	673 (8.49)	425 (5.36)

Source: Ministry of Water Resources, Govt. of India, <http://wrmin.nic.in/>

Figure 20. Consumption of Chemical Fertilizers in Punjab



Source: FAI (2006)

Figure 21. Per ha Fertilizer (kg/ha) Consumption in Selected States: 2005-06

Source: FAI (2006)

Table 6. Consumption ratio of N and P₂O₅ in relation to K₂O in Punjab and All-India: 2005-06

	N	P ₂ O ₅	K ₂ O
Punjab	27.8	7.3	1.0
All-India	5.3	2.2	1.0
Recommended	4.0	2.0	1.0

Source: FAI (2006)

In short, intensive use of inputs mainly irrigation water, pesticides and chemical fertilizers, which was central to green revolution, has created an ecological crisis in the State. If urgent remedial action is not taken, Punjab's agrarian crisis is bound to deepen.

Section III: Diversification through Contract Farming

Rational for Contract Farming in Punjab

Concerns about sustainability of intensive cultivation of rice and wheat in Punjab have been expressed way back in mid-1980s. The government of Punjab had constituted a committee under the chairmanship of Dr. S S Johl in 1984-85 and report was submitted in July 1986. The committee suggested the need to diversify agriculture in the State and shifting of at least 20 percent of area under rice and wheat crops in general but rice in particular to other competitive and profitable alternative crops like fruits, vegetables. However, no action was taken on this report. In late 1990s and 2000s, when impacts of agrarian and ecological crisis (declining productivity, depleting groundwater table,

deteriorating soil quality, soil and water pollution/degradation, etc.) in the State became clearly visible, another committee headed by Dr. S S Johl was constituted. The Committee recommended that one million hectare area under rice and wheat need to be shifted to other crops like oilseeds and pulses, which have less water requirement and are ecology and soil friendly and farmers who diversify should be compensated by giving Rs. 12,500 per hectare. To finance this initiative, the Punjab government asked the central government to provide Rs. 1280 crore per annum.

Given the Johl Committee recommendations and to respond to Punjab's agrarian crisis, an ambitious programme to encourage diversification through contract farming became the cornerstone of the government's strategy. A multi-crop multi-year contract farming scheme was launched by the State government to promote diversification and Punjab Agro Foodgrains Corporation (PAFC) was designated as the nodal agency for promoting/coordinating the activity of contract farming and diversification of agriculture in the State of Punjab. As per the observations of one of the officials of the PAFC, main objective of contract farming in the State was not to increase yields only but to save natural resources such as land and water. The programme of contract farming was first initiated in Rabi 2002 covering about 22 thousand acres with nine thousand farmers (PAFC, 2007).

However, there were several restrictions on participation of private/corporate sector in agriculture and all related activities. For example, the Essential Commodities Act (ECA) of 1955 restricted trade in food products to licensed traders, limits on stock holding and food processing sector was reserved for the small-scale sector. Most importantly, the Agricultural Produce Marketing Committee (APMC) Act required that farm produce be sold only at the designated government markets through registered intermediaries. Under the Act, the private sector/processing industry was not allowed to buy directly from farmers. The farmers were also restricted from entering into direct contract with any buyer because the produce was required to be channelized through regulated markets. These restrictions were acting as a disincentive to farmers, trade and industries. Therefore, first thing was to amend the restrictive APMC Act. The Central government drafted a model APMC Act (since agriculture falls under the jurisdiction of state governments) in 2002, which allowed the private players to set up markets not regulated by the market committee. Under the new Act, it was not necessary to bring agricultural produce covered under contract farming to the APMC market/private market and may be directly sold to contract farming sponsor from farmers' fields. Several State Governments have already initiated legal amendments to Agricultural Produce Marketing Committee (APMC) Act, which allows farmers to sell their produce in open markets and it has given a spurt to contract farming. Punjab was one of the first States to amend their APMC Act, which allowed private players including national and multi-national agribusiness firms to do contract farming directly with the farmers.

Till date, 16 states have amended the APMC Act, some partially and others wholly. Some do not have such an Act and, therefore, did not need to amend. However, several states have not notified the rules in the Act. All the 29 states will complete the process of amending the Agricultural Produce Marketing Committee (APMC) Act and notify the rules before March 2008. In the recent special meeting on agriculture and food of the National Development Council (NDC) it was emphasized to encourage development of modern markets by completing the amendments to the APMC Act and also encourage development of linkages to markets through a variety of instruments, including co-operatives of farmers, contract farming and other means preferred by the States.

Review of Studies on Contract Farming

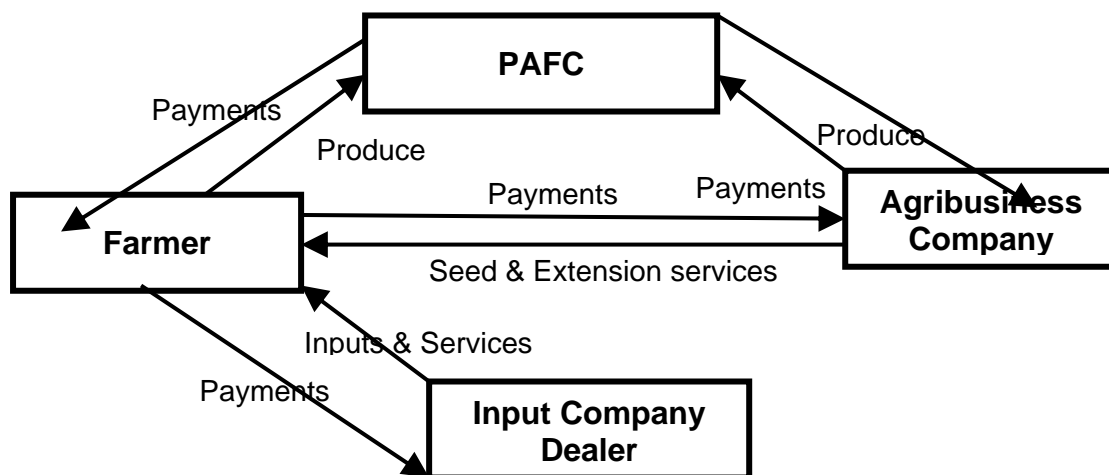
In the late 1980s, government allowed Pepsi to enter Indian market with the condition of establishing agro-processing facility in Punjab as part of strategy to create employment opportunities in the States. Pepsi built a very large tomato processing plant with a capacity to process 650 tonnes of tomatoes per day in the State. Pepsi's problem was shortage of raw material as tomato production in the State was small compared to capacity of the plant. To ensure availability of required quality and quantity of tomatoes, Pepsi entered into contract with farmers at an agreed purchase price and provided better quality seed, extension services and other package of practices. Studies in the 1990s showed that contract farming improved farmers' income although main beneficiaries were large farmers. Pepsi sold the processing plant to Hindustan Lever once the government's condition was no longer a binding and the plant was again sold in 2000.

Currently besides the PAFC, there are many national as well as international agribusiness companies doing contract farming in the State. For example, Pepsi is procuring basmati rice from farmers under contract farming. Frito-Lay a subsidiary of Pepsi manufacturing potato chips, procure tomatoes from farmers directly. Hindustan Lever, a subsidiary of Unilever, is contracting farmers to procure basmati rice for exports. Many other players such as Naranjan Rice Exports, AM Todd (previously Indo-mint), Chambal Agritech, Amira Foods, Kohinoor Foods (previously known as Satnam Overseas) and LT Overseas etc. are involved in contract farming programme to provide market linkage. United Breweries, the world's 2nd largest brewer and the largest in India, in collaboration with state government's Punjab Agro Foodgrains Corporation, is growing malting barley on about 4614 ha but the company is planning a major capacity expansion of its malting plant in the State, the plan is to increase barley acreage under contract farming to 10,117 ha by 2007-08.

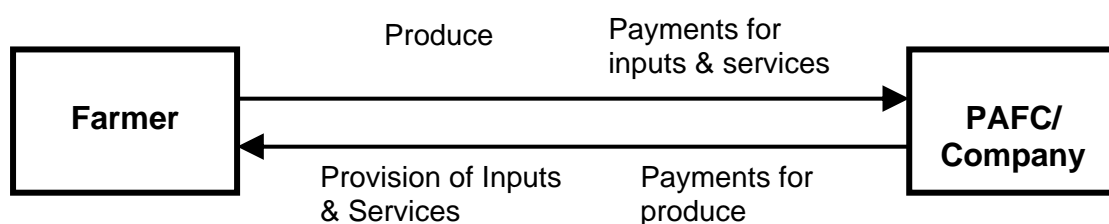
Agri-inputs industries in the business of seed, fertilizers, agro-chemicals, namely Escorts Ltd., Tata Chemicals, DCSCL, Mahindra Shubhlabh, ITC, etc. have signed agreements with the farmers to provide extension services and assured buyback with PAFC support. However, none of the companies involved in contract farming in the state provide all required inputs such as pesticides, fertilizers, and more importantly credit to the farmers. Majority of farmers are still dependent on middlemen/traders/moneylenders for production as well as consumption finance. Most of the companies provide seed and extension services to the contract farmers. There are certain concerns about quality of extension services provided by almost all companies except for a couple companies who have hired professional agricultural graduates for extension services.

Role of State Government in Promoting Contract Farming

To give a boost to diversification of agriculture in the Punjab, a comprehensive programme of contract farming was launched in October 2002 by the State government. Punjab Agro Foodgrains Corporation, nodal agency for implementing contract farming in the State, provides/arranges high yielding varieties of seeds, technical supervision and follow-up on agronomic practices to the farmers and assured buy-back at MSP or agreed price or market price depending upon the crop. PFAC has adopted multipartite model involving various stakeholders, farmer, private agribusiness firms and government or PAFC (Figure 22).

Figure 22. Tripartite Agreement between Farmers, Input Suppliers and PFAC

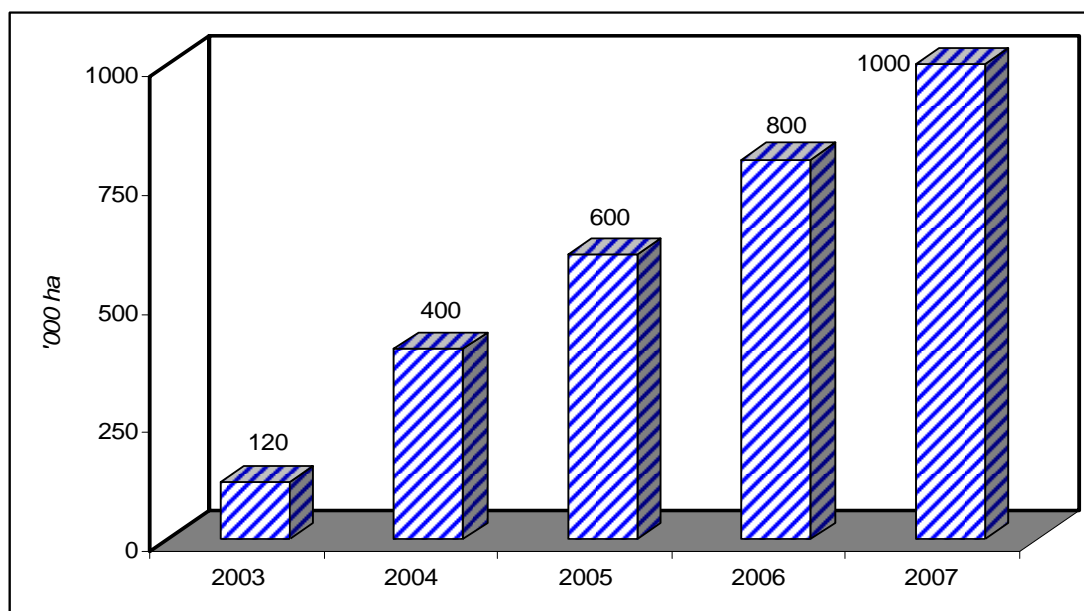
As mentioned earlier that PAFC acted as a facilitator between the farmer and agribusiness firm. However, in some crops such as hyola, where there were no buyers, PFAC set up a commercial facility for production of hyola oil and procured hyola from farmers for its own processing plant (bipartite model) and started marketing in the market under the brand name "Five Rivers Hyola Oil". PAFC also provided inputs such as seed, fertilizers, pesticides, etc. and extension services to the farmers. In case of other crops, PFAC entered into an agreement with agribusiness companies on behalf of farmers and farmers sold their produce to PAFC, which in turn sold produce to agribusiness company and payments were made to farmers through PAFC at fixed contract price. Once trust between farmer and company was built, PFAC withdrew it self and there was direct contract between farmer and agribusiness company (bipartite model Figure 23). However, in one year when prices of basmati rice crashed in the market due to excess production, the buyer backed out and started rejecting the produce on quality considerations. PAFC had to enter the markets and procure basmati rice at fixed contracted price to build confidence among the farmers. Based on the experience, contracts were made more flexible and farmers were allowed to sell outside the contract if market price was higher than contracted price. Even in contracted price, prices were fixed for different grades such as A, B C, based on quality parameters such as moisture content, admixture, broken and method of harvesting rather than outright rejection. Discussions with various stakeholders revealed that nearly 50-60 percent farmers are committed and there is little chance of breach of contract, while some farmers do take advantage of market conditions and sell contracted quantity in open market if price is higher.

Figure 23. Bipartite Agreement between Farmers and PFAC/Company

The private firms include a number of players like input suppliers, extension service providers, agro-processing companies, exporters, etc. PAFC acts as a facilitators and link between farmer and agribusiness firm. Due to long and strong association of farmers with the government agencies like PAFC, Markfed, Punjab Agro Industries Corporation (PAIC), Food Corporation of India (FCI), Department of Agriculture, etc. through procurement operations, supplies of inputs and services, farmers have great confidence in government agencies. Farmers had lack of confidence in private companies as they felt that companies are more concerned about their own welfare rather than farmer's welfare, companies may or may not procure, may not pay remunerative price, etc. Their fears were based on their experiences of fraudulent seed and pesticides companies. Moreover farmers of Punjab were more secured as whole of wheat and rice marketable surplus was procured (regardless of quality) by government agencies at government announced MSP. Therefore, it was extremely difficult for private sector to get into contract farming in the State. However, with committed political leadership and dedicated bureaucracy, contract farming was introduced in the State, which has shown very good results (Figure 24). PAFC first started the programme in Rabi 2002 covering an area of about 9 thousand hectares with 9100 farmers and in 2006-07 an area of more than 2.8 lakh ha involving more than one lakh farmers has been covered under crop diversification programme through contract farming (PAFC, 2007).

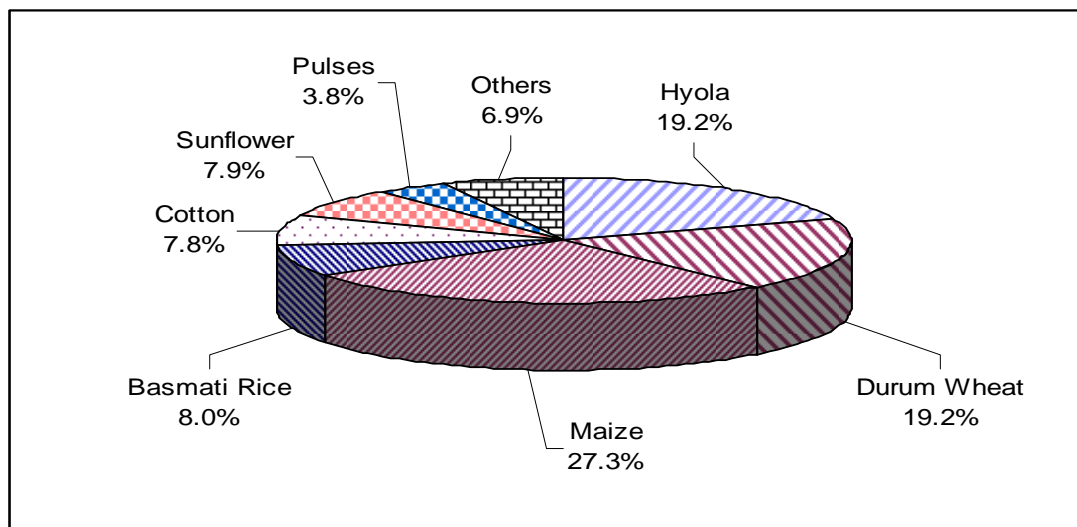
As main objective of contract farming was to shift area from rice-wheat crop rotation to less water intensive crops, emphasis was given on introduction of less water intensive crops like basmati rice, hyola (hybrid rapeseed mustard), sunflower, malting barley, durum wheat, pulses, maize, etc. (Figure 25) For example during the triennium ending 2006-07, highest area was allocated under maize (27.3%), followed by about 19 percent each for durum wheat and hyola, basmati rice (8%), sunflower (7.9%) and cotton (7.8%).

Figure 24. PAFC's Five Year Plan for Contract Farming



Source: PAFC (2007)

Figure 25. Share of Major Crops under Contract Farming Programme in Punjab, TE 2006-07



Source: PAFC (2007)

State Interventions and Incentives

Government Incentives for Promoting Contract farming

In order to encourage contract farming in Punjab, the state government has given various incentives to agribusiness companies involved in contract farming. For example, Punjab State Agriculture Marketing Board, which was established on 26th May, 1961 to control and supervise marketing network of sale, purchase, storage and processing of processed or un-processed agricultural produce and establishment of markets for agricultural produce in the state, levies 2 percent market fee on purchase or sale transactions of all agricultural produce. In addition to this, the State government also levies 2 percent rural development fund on the purchase or sale of agricultural produce. These levies add to the cost and act as disincentive for private companies to participate in agricultural markets. The State government has reduced taxes and levies like market fee, rural development fee from 2 percent to 0.25 percent each (except for wheat and rice) thus leading to an aggregate saving of 3.5 percent, which makes the procurement of agricultural produce competitive for the processors. All processing units have been allowed to purchase agricultural products directly from the farmers and these exemptions have been given to them under the amended Punjab APMC Act.

Similarly, companies were supposed charge for extension services from farmers for which farmers were not willing to pay. The PAFC paid about Rs. 200 per hectare for all contracted crops (Rs. 250 per ha for maize) to the companies providing extension services for first three years. Thereafter, companies would absorb these costs.

In order to promote mechanization, some new equipments such as sub-soiler (soil chisler), maize planter, dehusker cum thresher, sunflower combine harvester, maize ear dehusker, maize drier, rice disc puddler, rice seedling marker, rice pre-cleaner, rice transplanter, combine harvester, seed-cum-fertilizer drill for barley, tandem disc harrow, cotton, stalk Puller were either developed or purchased for use by farmers on custom-hiring basis/free. In addition some financial/infrastructural support for awareness programmes was also being provided by the PAFC to the agribusiness companies engaged in contract farming.

Restrictions on stocking and movement of food grains, sugar and edible oils have been abolished under the Removal of Licensing Requirements Stock Limit and Movement Restrictions on Specified Food Stuffs Order, 2002 by the Government of India.

Smallholder Producers' Participation in Contract Farming

Table 7 shows distribution of number of operational holding and area operated by major size groups in Punjab from 1970-71 to 2000-01. There are less than one million operational holdings in the State. It is evident from the Table that about 29.7 percent of operational holdings in the State are small and marginal (all-India 81.9%), which operate 7.9 percent of operational area (39% all-India). The percentage of landholdings in the marginal and small groups declined in the State while medium to large size group holdings increased, which is opposite to all India trends.

A smaller proportion than in other states as well as at national level, farmers cultivating less than four hectares (marginal, small and semi-medium farmers) remain the majority in Punjab (62.5 % in 2000-01) cultivating about 29.7 percent of total area (Table 7). Total number of operational holdings in Punjab declined from 1375 thousand in 1970-71 to 997 thousand in 2000-01 (27.5% decline), while they are increasing at national level. Decline in number of operational holdings illustrates that the fact that reverse tenancy is common in Punjab. The average size of operational holding in Punjab is more than three times (4.03 ha) compared with all India (1.32 ha) in 2000-01 but still small as per private sector standards.

Table 7. Distribution of Operational Holdings in Punjab; 1970-71 to 2000-01

<i>Category</i>	<i>1970-71</i>	<i>1980-81</i>	<i>1985-86</i>	<i>1990-91</i>	<i>1995-96</i>	<i>2000-01</i>
<i>Number ('000)</i>						
Marginal (<1 ha)	518 (37.6)	197 (19.2)	256 (23.5)	296 (26.5)	204 (18.7)	123 (12.3)
Small (1.0-2.0 ha)	260 (18.9)	199 (19.4)	208 (19.1)	204 (18.3)	183 (16.7)	173 (17.4)
Semi-medium (2.0-4.0 ha)	281 (20.4)	287 (28.0)	291 (26.7)	289 (25.9)	320 (29.3)	328 (32.9)
Medium (4.0-10.0 ha)	248 (18.0)	269 (26.2)	260 (23.9)	261 (23.4)	306 (28.0)	301 (30.2)
Large (>10 ha)	69 (5.0)	74 (7.2)	74 (6.8)	67 (6.0)	80 (7.3)	72 (7.2)
Total	1375 (100.0)	1027 (100.0)	1088 (100.0)	1117 (100.0)	1093 (100.0)	997 (100.0)
<i>Area ('000 ha)</i>						
Marginal (<1 ha)	-		139 (3.4)	164 (4.1)	122 (2.9)	78 (1.9)
Small (1.0-2.0 ha)	-	399 (10.3)	311 (7.6)	328 (8.1)	240 (5.8)	242 (6.0)
Semi-medium (2.0-4.0 ha)	-	791 (20.3)	840 (20.5)	842 (20.9)	833 (20.1)	876 (21.8)
Medium (4.0-10.0 ha)	-	1566	1589	1622	1754	1731

		(40.3)	(38.7)	(40.2)	(42.3)	(43.0)
Large (>10 ha)	-	1135 (29.2)	1225 (29.7)	1077 (26.7)	1198 (28.9)	1096 (27.3)
Total	-	3890 (100.0)	4104 (100.0)	4033 (100.0)	4147 (100.0)	4022 (100.0)
<i>Average size of operational holding</i>						
Marginal (<1 ha)	-		0.54	0.55	0.60	0.63
Small (1.0-2.0 ha)	-	1.01	1.50	1.61	1.31	1.40
Semi-medium (2.0-4.0 ha)	-	2.76	2.89	2.91	2.60	2.67
Medium (4.0-10.0 ha)	-	5.82	6.11	6.21	5.73	5.75
Large (>10 ha)	-	15.34	16.55	16.07	14.97	15.14
Total	-	3.79	3.77	3.61	3.79	4.03

Source: Govt. of Punjab (2006)

Various studies have shown that small and marginal farmers are generally excluded from the contract farming as companies prefer large farmers for contract, perhaps to avoid problems of dealing with large number of small and marginal farmers and high transaction costs. The earlier studies by Rangi and Sidhu (2000), Singh (2002), Singh and Asokan (2003), Kumar (2006) also supplement the argument of smallholder exclusion. Recent study showed that only 15 percent of contract farmers in Punjab are small and marginal farmers and rest of farmers are medium and large farmers with more than 4 ha farm size. Sometimes, small and marginal farmers find it more profitable to lease-out land as rent on land is higher than net returns from land. In addition, off-farm employment opportunities are also available in the State.

Section IV: A Case Study of Basmati Rice Contract Farming in Punjab

Worldwide, India stands first in rice area and second in rice production, after China, contributing over 20 percent of global rice production (FAO, 2007). Within the country, rice is important crop occupying more than one-third of the total area under foodgrains, contributing about 44 percent of total foodgrain production and continues to play a vital role in the national food and livelihood security system. A combination of increased area and productivity increases transformed India from a net importing country in the mid-1960s to a potential exporter of rice by the early 1990s. The development and rapid adoption of high-yielding rice varieties from the late 1960s contributed to phenomenal output growth and enhanced the per capita availability of rice, despite growing population.

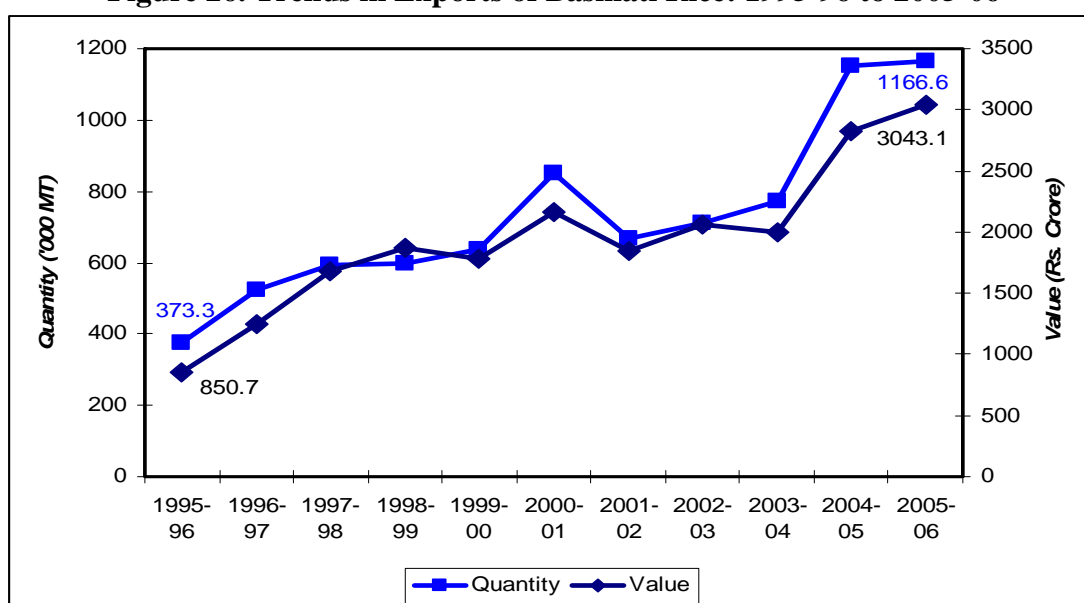
India is the largest producer and exporter of basmati rice in the world. The annual production in the country is hovering around 1.5-2.0 million tonnes a year, of which around two-third is exported. The remaining is consumed, within the country. Basmati rice is primarily cultivated in India and Pakistan and the Himalayan foothills are said to produce the best basmati. In India basmati rice is grown exclusively in Punjab, Haryana and Western Uttar Pradesh. Punjab is the fourth largest producer of rice contributing over 11 per cent to the total rice production in the country. In 2005-06, Punjab produced 10.2 million tonnes of rice (Govt. of India, 2007).

Of the 29 million tonnes of rice traded annually in the world market, basmati rice accounts for less than 10 percent (FAO, 2007). But basmati rice generates three times higher returns than non-basmati rice in both international and domestic markets. From a

small beginning in late 1970s, when India exported few thousand tonnes of basmati rice, an upward swing continued and 2005-06 witnessed the highest volume (1.16 million tonnes) of basmati rice exports with record foreign exchange earnings of Rs. 3043 crore (Figure 26). In fact, Basmati rice has been one of the fastest and consistently growing export items from India in recent years.

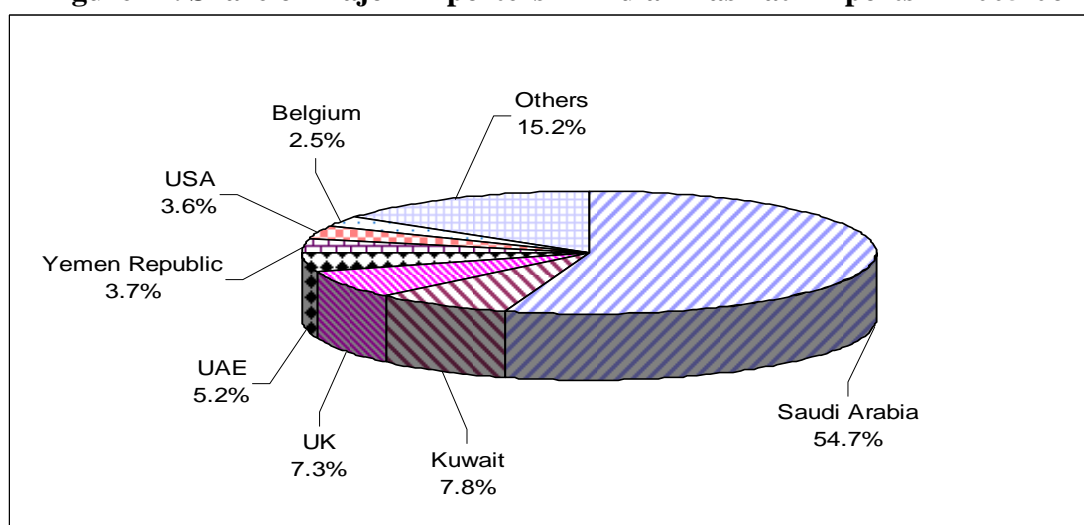
India's major markets for basmati rice exports have been Middle-east countries, namely, Saudi Arabia, Kuwait, United Arab Emirates, Yemen Republic, and other major importers include UK, USA, Belgium, Italy, Netherlands, and Canada. In fact, Saudi Arabia traditionally has been the largest market for Indian basmati rice, with an export share of more than 50 percent, followed by Kuwait (7.8%), UK (7.4%), and United Arab Emirates (5.2%) in 2005-06 (Figure 27). Gulf region remains the major markets for Indian basmati rice. Pakistan is the sole competitor for India in the international market for basmati rice.

Figure 26. Trends in Exports of Basmati Rice: 1995-96 to 2005-06



Source: APEDA (2007)

Figure 27. Share of Major Importers in Indian Basmati Exports in 2005-06

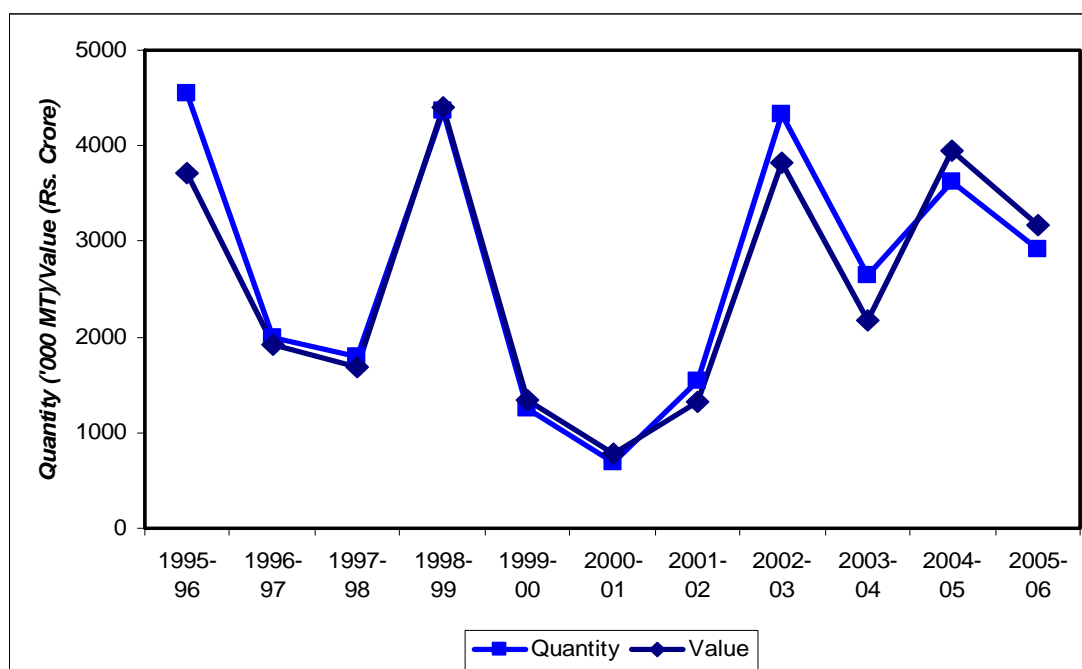


Source: APEDA (2007)

Non-basmati rice is also a major item for export promotion, but exports have been fluctuating due to government intervention in non-basmati rice segment (Figure 28). The highest quantum exported was 4.5 million tonnes in 1995-96, earning foreign exchange amounting to Rs. 3717 crore. Thereafter, non-basmati exports have varied from less than one million tones in 2000-01 to about 4.3 million tones in 2002-03. Non-basmati rice of *indica* type constitutes more than 80 percent of the world rice trade.

Earlier most of private companies used to purchase basmati rice from the market yards (*mandies*) from Punjab and Haryana and process as per the requirements of the clients and export it. However, of late issues of traceability and quality became very important in the export markets. Hence in order to have better control over procurement of quality produce in required quantity, the companies started investing in backward linkages and introduced contract farming of basmati rice in Punjab in late-1990s and early-2000s. The initiative got a big boost from the state government, when government allowed contract farming in 2002 with an objective of diversification of agriculture and basmati rice was one of the focus commodity for promoting contract farming. The companies entered into written as well as oral contracts with the farmers. The agreement covers price, quality in terms of moisture content, admixture, broken percentage, etc., delivery points, purchase agreement, crop management practices, etc. The area under basmati rice as well as number of farmers under contract farming has been increasing but also fluctuating in Punjab. The companies which are involved in contract farming of basmati rice in the state include Pepsi Foods Ltd., Tata Chemicals Ltd., Chambal Agritech, Naranjan Rice exports Pvt. Ltd. and Hindustan Level Ltd. (a subsidiary of Unilever).

Figure 28. Trends in Exports of Non-Basmati Rice: 1995-96 to 2005-06



Source: APEDA (2007)

Methodology

The study team had detailed discussion with the Punjab Agro Foodgrains Corporation (PAFC) and some companies involved in contract farming in the state about selection of

crops and districts. The focus of study was to examine impact of corporate-led agricultural growth through a case study of recent experiments with contract farming in foodgrains in Punjab as the State has relatively long history of corporate involvement in agriculture and has strong government support for contract farming. The study was restricted to basmati rice as there was not much contract farming in wheat and non-basmati rice in the state. The study was confined to two districts namely, Ludhiana and Jalandhar, covering about 50-60 farmers. However, finally a small sample of about 40 farmers growing basmati rice was used for the present case study as rest of the farmers were growing other crops such as hyola (hybrid rapeseed and mustard) and maize, hence not included in the analysis. The study is based on a small sample size, therefore, generalization of results needs to be avoided. The socio-economic profile, landholding pattern, cropping pattern and productivity related issues are discussed in the following section.

Socio-economic Profile of Sample Households

Table 8 shows demographic characteristics of sample households. Almost all the households in the sample were male-headed with an average family size of six members per household under contract farming and ten members in case of non-contract households. The average age of household heads of contract farmers was lower (39 years) compared to non-contract farmers (45 years), which indicates that younger farmers have strong preference for contract farming. Most of the sample households (for both contract and non-contract) are literate but it is also worth noting that in the case of contract farm households, household heads attained higher formal education compared to non-contract household heads, indicating that educated farmers are more keen in contract farming. The average number of years in school of the household heads in the contract farmer sample was 10 years and in non-contract farmers was seven years.

Crop farming is main occupation for almost all households under both contract and non-contract farmers. Dairy farming is a subsidiary occupation for more than 80 percent of households. These figures reinforce the observation that most of households have mixed crop farming system.

Table 8. Demographic Characteristics of Sample Households

	Contract farmers	Non-Contract farmers
Age (Years)	39	43
Education (Years of schooling)	10	7
Family Size	6	10
Male	2	3
Female	2	3
Male Children	1	2
Female Children	1	2
Main occupation		
Agriculture	96.5	100
Subsidiary		
Dairy	86.2	80.0
Others	13.8	20.0

Source: Field Survey

Land Ownership and Distribution Pattern

Land ownership pattern of sample households is given in Table 9. The average size of operational holdings was larger (10.5 hectares) in case of contract farmers than in non-contract farmers (4.8 hectares). In case of contract farmers, majority of households (41%) have average operation holding of more than 10 ha, followed by 28 percent households having 4-10 ha while proportion of small and marginal farmers (≤ 2 hectares) was only 7 percent. In contrast, proportion of farmers having operational holding less than 4 hectares (average farm size of the State) was nearly 60 percent. These results clearly show that medium and large farmers are major beneficiaries of contract farming in the State.

Tenancy is allowed in the state; therefore, leasing of land is quite common. The average area under lease is higher (5 hectares) in case of contract farmers than non-contract farmers (3.2 hectares). The area under lease has increased from 3 hectares in 2002 to 5 hectares in 2007 in case of contract farmers; while the corresponding figures for non-contract farmers are 1.5 and 3 hectares. The data shows that largely medium and large farmers are leasing in land to increase their operational holding to enter into contract farming, which most companies prefer. Fixed rent and payment in cash are the dominant practices and rent is fixed per hectare. The average rent per hectare per year in the study area was higher (Rs. 25,755) in contract farmers than non-contract farmers (Rs. 23,887). The average cropping intensity is marginally higher (183%) in case of contract farmers than non-contract farmers (178%).

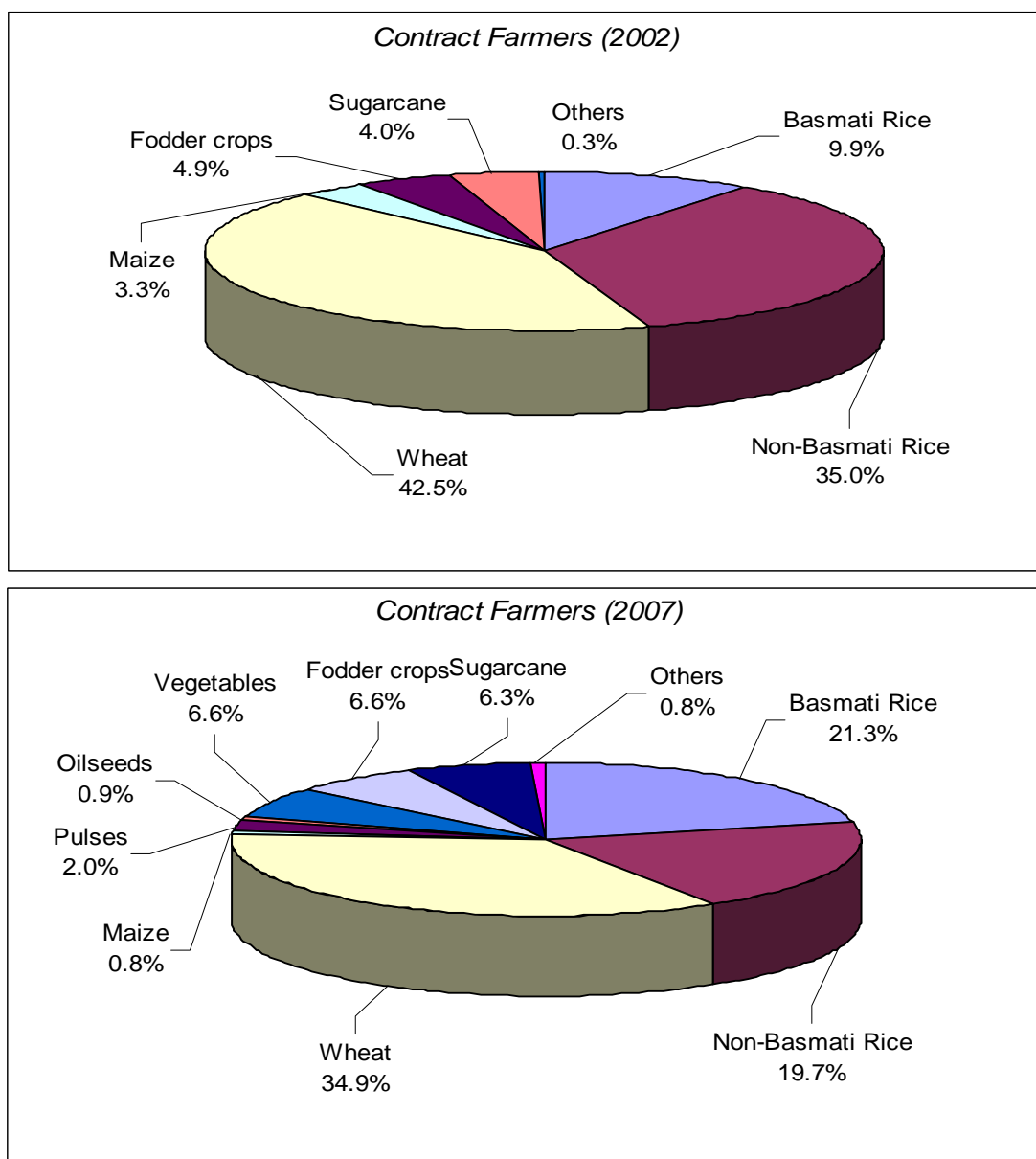
Table 9. Land Ownership Pattern in Sample Households (ha)

	Contract farmers		Non-Contract farmers	
	2007	2002	2007	2002
Owned land	5.5	5.5	1.6	1.6
Leased-in	5.0	3.0	3.2	1.5
Leased-out	0.1	0.0	0.0	0.0
Operational Holding	10.5	8.4	4.8	3.1
Terms of Lease				
Fixed rent (%)	100.0	92.3	100.0	100.0
Share Cropping (%)	0.0	6.7	0.0	0.0
Average lease (Rs/ha)	25,755	20,910	23,887	20,591

Source: Field Survey

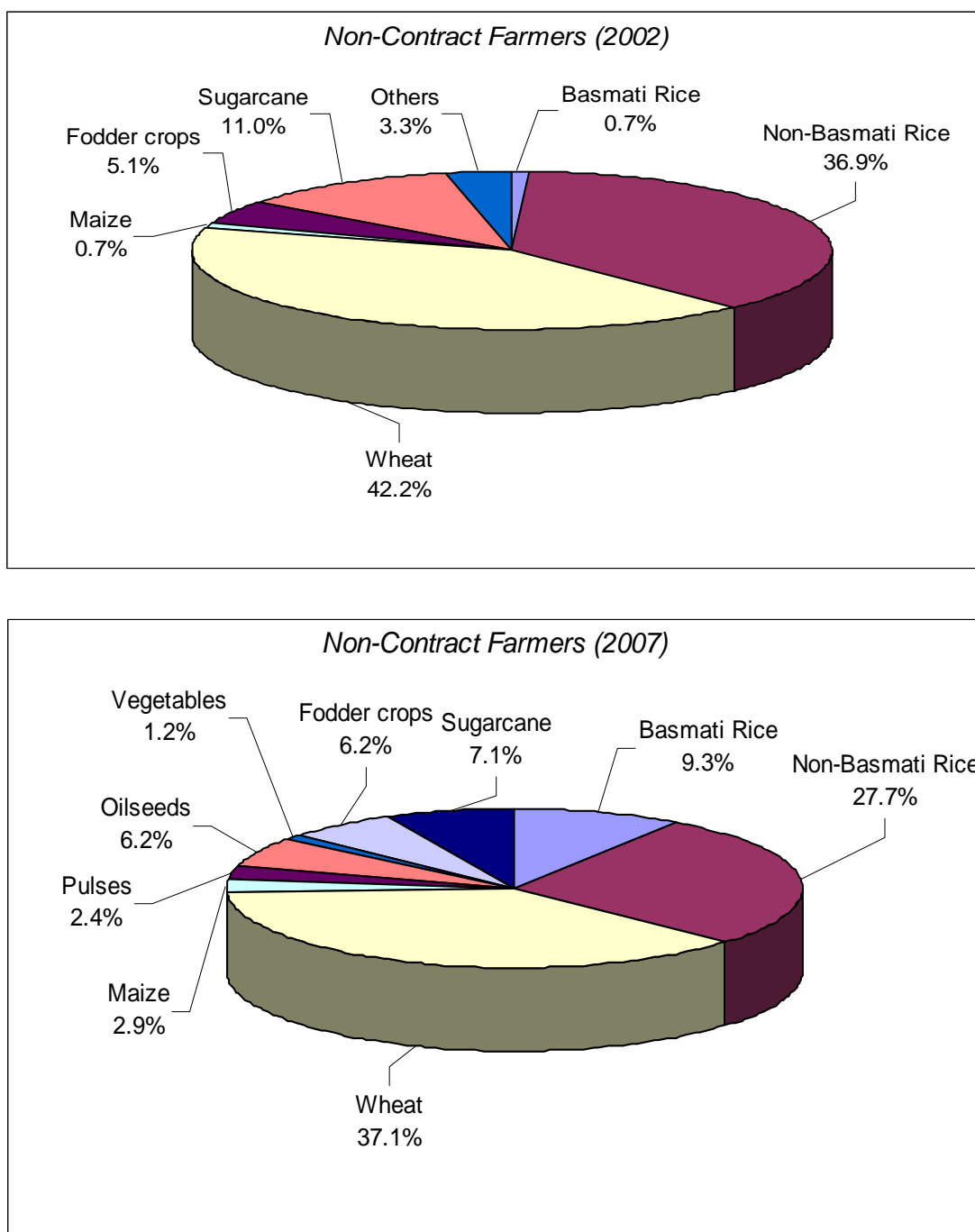
Cropping Pattern

Farmers grow a variety of crops in the study area (Figure 29). In the contract households, rice (basmati and non-basmati) is a main crop occupying 41 percent of gross cropped area during kharif season and wheat (34.9%) in rabi season, accounting for over three-quarters of the total cropped area. Vegetables and sugarcane are two other important crops, occupying about 13 percent of gross cropped area. The average area allocated for fodder crops is about 6 percent. The area under basmati rice has increased between 2002 and 2007, whereas, area under non-basmati rice has declined during the same period.

Figure 29. Cropping Pattern Shifts in Sample Contract Farmers

Source: Field Survey

The cropping pattern on non-contract farms is also dominated by rice (37%) in kharif and wheat (37.1%) in rabi season, accounting for nearly 75 percent of the gross cropped area (Figure 30). Sugarcane accounted for over 7 percent of acreage, followed by oilseeds (6.2%), and fodder crops (6.2%). The area under basmati rice has increased between 2002 and 2007, whereas, area under non-basmati rice has declined during the same period.

Figure 30. Cropping Pattern Shifts in Sample Non-Contract Farmers

Source: Field survey

It is interesting to note that area under basmati rice is significantly higher (21.3%) in case of contract farmers compared to non-contract farmers (9.3%). In contrast area under non-basmati rice is higher (27.7%) in non-contract farmers compared to contract farmers. It is evident from the results that there is shift in area from water-intensive non-basmati rice to basmati rice in both contract and non-contract farmers after introduction of contract farming in the State. However, this shift in area is more pronounced in contract farmers compared with non-contract farmers. These results clearly show the impact of

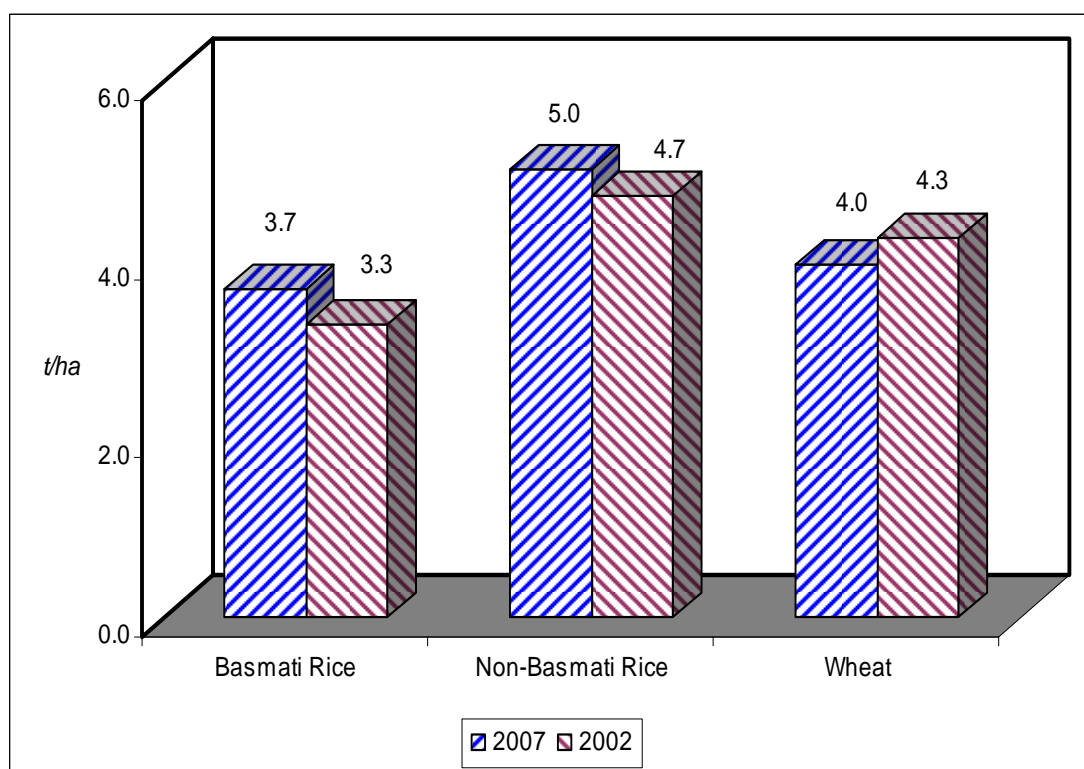
government efforts to shift area from non-basmati rice, which is a water-intensive crop, to basmati rice (less water intensive crop).

Impacts of Contract Farming

Contract farming has been used to promote new high-value crops, which are more input intensive, risky, and market dependent for profitability, to lower costs either by yield improvement or cutting input costs through better extension services, and to raise returns by value addition to primary produce. In order to examine impact of contract framing in yields, we compared productivity levels of major crops such as rice (basmati and non-basmati) and wheat between 2002 and 2007 on contract farms as well as between contract and non-contracts households in 2007 and results are presented in Figures 31 and 32.

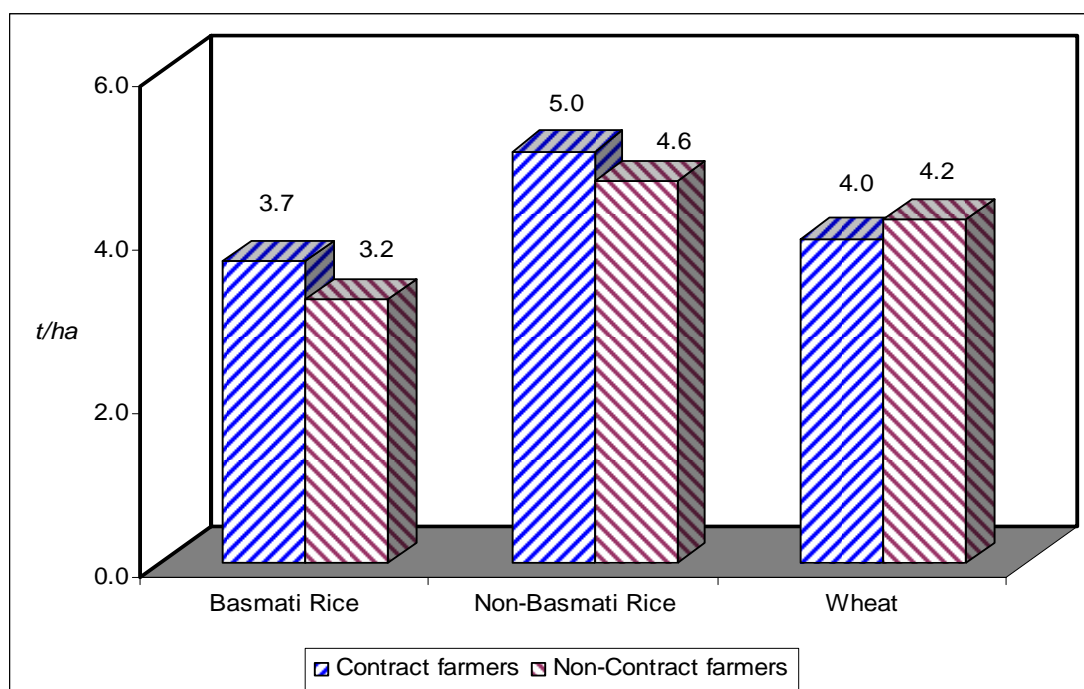
The per hectare productivity of basmati rice under contract farming showed an increase of about 12 percent (3.7 tonne in 2007 compared with 3.3 tonne in 2002), followed by non-basmati rice (6.4% increase). While wheat productivity witnessed a declining trend and yield declined from 4.3 tonne per ha in 2002 to 4.0 tonne in 2007, which is consistent with state level productivity trends (Figure 31). Due to increase in crop productivity, area under basmati shows an increasing trend over the years. Many farmers believe that better quality seeds supplied by the companies along with better extension services have been responsible for increased crop yields in the area.

Figure 31. Trends in per hectare Productivity of Rice and Wheat on Contract Farms: 2002 and 2007



Source: Field Survey

Figure 32. Comparison of Productivity of Rice and Wheat on Contract and Non-Contract Farms in 2007



Source: Field Survey

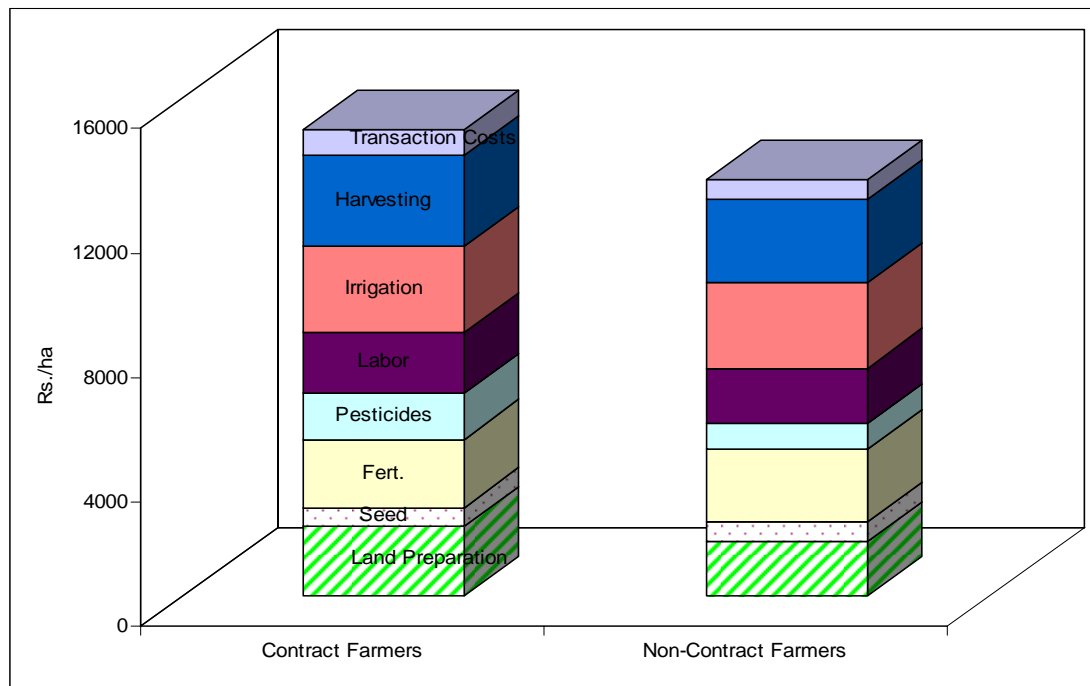
A comparison of productivity level between contract and non-contract farmers reveals that average yield of rice (both basmati and non-basmati) is higher in case of contract farmers, while wheat yield is marginally higher on non-contract farms. The basmati rice yield per hectare is about 16 percent higher in case of contract farmers compared with non-contract farmers. The important reasons for higher yield on contract farms identified by the respondents include better quality seeds, appropriate crop management practices introduced by the sponsors and close monitoring of the crop at all stages by the companies. The average cost of production is higher on contract farms than non-contract farms (Figure 33) but increased costs are compensated by higher productivity levels. The net income per hectare is also higher on contract farms compared to non-contract farms (Figure 34).

Perceived Benefits and Constraints in Contract Farming

The main driving force behind contract farming in the state is Punjab Agro Foodgrains Corporation, a state public sector unit, whose main emphasis is on diversification of agriculture. The programme was started during Rabi 2002 with an area of few thousand hectares which has now increased to about one million hectares. Farmers in the state have fairly good experience of contract farming. In order to understand perceived benefits and constraints in adoption of contract farming, selected households were asked to list main reasons for adopting contract farming and results are presented in Table 10. The results show that assured market price is the most important reason for adopting contract farming. Assured price ranks second (52%) followed by better extension services (45%). This shows that farmers need more assured market than assured price. Under assured price, some companies offer a floor/minimum price in the agreement and final price is decided based on market conditions, while in some cases companies announce a fixed price. However, under both conditions, farmer is free to sell in the market if market price is higher than sponsor's price. Some estimates indicate that more than 60 percent farmers

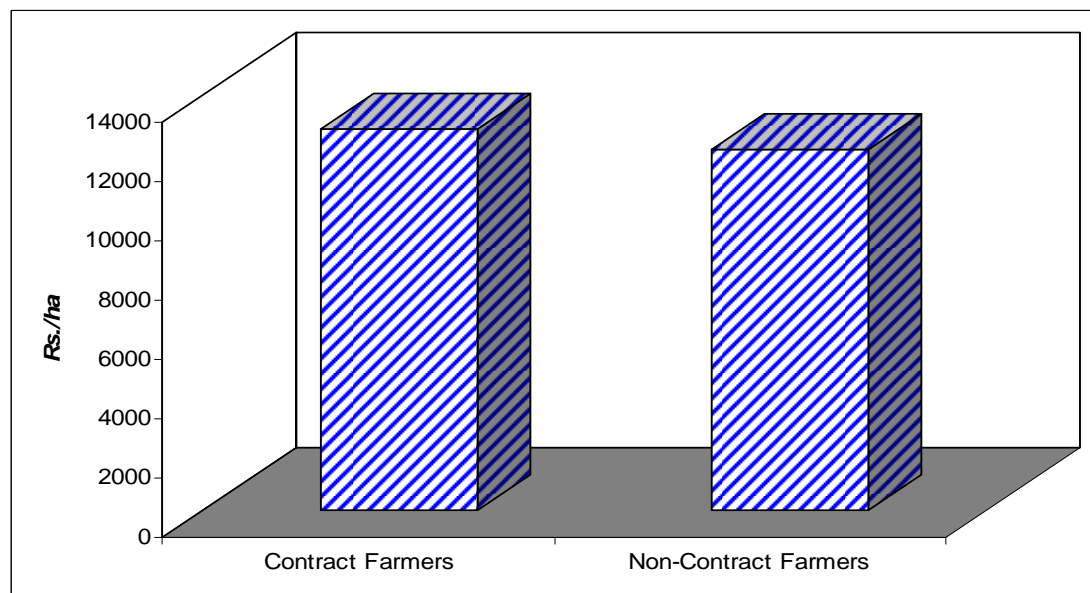
honor the agreement and sell produce to the company. Other reasons for contract farming included higher returns from basmati rice than competing crops, less water requirement of basmati rice, inspiration from fellow farmers who had adopted contract farming and personal relations with the company.

Figure 33. Comparison of Basmati Rice Cost of Production (Rs./ha) on Contract and Non-Contract Farms in 2007



Source: Field Survey

Figure 34. Comparison of Net Income (Rs./ha) from Basmati Rice



Source: Field Survey

Table 10. Reasons for Adopting Contract Farming as Reported by Respondents

<i>Reasons</i>	<i>Percentage</i>
Assured market for produce	83
Assured price	52
Minimum floor price	38
Better price than alternative marketing channels	24
Good extension services	45
Less water requirement compared with competing crops	28
Higher returns than competing crops	14
Less incidence of diseases	7
Inspired by other contract farmers	4
Personal relations	4

Source: Field Survey

It is also important to understand the downside of contract farming. Some of the farmers have discontinued contract farming or changed a company. In order to understand reasons for discontinuing contract farming farmers were asked to list the reasons and the results are presented in Table 11.

Table 11. Reasons for Discontinuing Contract Farming as Reported by Respondents

<i>Reasons</i>
Unable to meet quality standards
High rejection rates
Lower price compared with market price
Distance of sales/delivery point
Delay in payments

Source: Field Survey

Majority of farmers were not able to meet the quality standards prescribed by the company as farmers are accustomed to quality checks by private traders and/or Food Corporation of India, where quality standards are not very stringent. However, most of the companies engaged in contract farming are export-oriented, therefore, more emphasis on quality. The rejection rate was quite high in some cases and that was also one of the reasons for discontinuing the contract farming. Some companies paid marginally lower price compared with market price as they provided better extension services, seed and other inputs (on payment basis), which improves farm productivity, thereby farmer gets higher net income. However, some of the farmers are not able to appreciate increase in net income due to better quality high yielding seed, better extension services, but more driven by price (which is not a good indicator) and discontinued contract farming. Some farmers reported other reasons such as distance of sales/delivery point from farm and delay in payments for discontinuing contract farming. However, among all factors failure to meet quality parameters given by the company turned out to be the most important reason for discontinuing contract farming. Therefore, efforts in this area are required by both agribusiness companies involved in contract farming as well as state government agencies responsible for development of agriculture in the state.

Non-contracting farmers were asked reasons for not adopting contract farming and the results are presented in Table 12. It is evident from the table that smallholding is a big

constraint for small and marginal farmers to enter into contract farming as companies prefer large farmers. Results of farm size of selected households revealed the same trends. Even during informal chat with government officials as well as private companies, this point came out very clearly that present phase of contract farming in the state has not been able to include small farmers in the programme.

In some cases market prices were marginally higher or at par with contract prices, so farmers did not find it useful to enter into contract with the company. Public good nature of extension services/knowledge was also mentioned as one of the reasons for not adopting contract farming. Other social factors influencing decision about contract farming were reluctance on the part of farmers to share information about land with private company and uncertainty about policies of the company.

Table 12. Reasons for not Adopting Contract Farming as Reported by Respondents

<i>Reasons</i>
Companies not keen due to smallholding
High market price compared with companies involved in contract farming
Can get extension services provided by the company from fellow farmers (public good and market failure problem)
Reluctant to share information about land with private company
Not sure about policies of the company

Source: Field Survey

Section V: Concluding Observations and Broad Policy Implications

Agriculture is and will remain the mainstay for a large proportion of rural population in the coming years, many of which are rural poor. Promoting more rapid and broad-based agricultural growth, particularly achieving 4 percent growth not only in the 11th Five year plan but for medium to longer term, will be extremely important not only for achieving higher economic growth but also alleviating poverty in rural areas. The current crisis of Indian agriculture will increase unless prompt remedial actions are initiated by the government. One way to increase agricultural growth and farm incomes is to shift from traditional cereal-based cropping system to high-value agriculture and also link producers to the markets. High value agriculture gives higher returns but it is also risky. Majority of farmers are small and marginal, who have poor link with the markets and low risk-bearing capacity, which restricts their participation in fast changing dynamic markets.

Corporate agriculture, especially through contract farming, is being promoted by central as well as state governments as a part of their strategy to solve some of these problems. Contract farming arrangements are expected to enable the farmers to access better quality inputs such as seed, fertilizers, pesticides, extension services, and credit from the corporate sector. Contract farming has also potential to eliminate and/or reduce markets and price risks, which farmers face. However, it all depends on the nature of contracts, legislation for regulation of contract farming, enforcement, dispute resolution mechanisms, etc.

The results of cropping pattern revealed that efforts of state government to shift area from water-intensive rice crop to basmati rice and other crops have shown good results as area under basmati rice has increased significantly in the study area while area under non-basmati rice has declined in case of contract households. Similarly area under other crops

such as maize, hyola, barley, sunflower, etc. being promoted for diversification has also increased during the last few years. The empirical results also indicated that contract farming was more skewed towards medium and large farmers while smallholder producers were left out by the private companies. The productivity data clearly showed a visible positive impact on crop yields of contract farmers compared with non-contract farmers. The average cost of production of basmati rice was higher on contract farms in comparison to non-contract farmers. However, this increase in cost of production was compensated by high productivity levels. Prices offered by the agribusiness companies involved in contract farming were more or less at par with market prices. The present models of contract framing are not completely integrated as most of the companies involved in contract farming in the state provide only seed and sometimes extension services. None of the companies supply other inputs such as pesticides, fertilizers, and more importantly credit. For credit requirements, a large proportion of farmers is still dependent on informal sources mainly money lenders who charge very high interest rates.

Regarding the question of inclusion of smallholder producers in the restructured markets, our field data as well as discussions with different players in the supply chain indicated that contracting companies have preference for medium and large farmers to reduce their transaction costs and ensure quality standards. This case study has highlighted the importance of new and growing feature of corporate-led Indian agriculture through contract farming but the success of these initiatives will largely depend on how they include large number of small and marginal farmers under the changing market structures and policy environment.

The lessons from this case also have wider significance in connection with the question of how successful approaches to contract farming can be developed. These lessons include: First, it is important to provide an integrated set of services including credit and not just extension services and seed. Second, partnerships between public and private sector companies/organizations are needed in order to provide these integrated services. The third and perhaps most important is to improve bargaining power of smallholder producers while also reducing transaction costs for companies through promotion of producers' groups/association/cooperatives. Small farmers will be able to effectively participate in the changing markets and establish links with new market chains (supermarkets, agribusiness companies, processors, exporters, etc.) only if they have access to basic infrastructure, inputs and services and are organized.

References

- APEDA (2007), “*Export Statistics for Agro & Food Products 2003-04 to 2005-06*”, Agricultural and Processed Food Products Export Development Authority, New Delhi.
- CSO (2007), “*National Accounts Statistics 2007 and back issues*”, Central Statistical Organization, Ministry of Statistics and Programme Implementation, Government of India, New Delhi.
- FAI (2006), “*Fertilizer Statistics 2005-06*”, The Fertilizer Association of India, New Delhi.
- FAO (2007), “*Rice Market Monitor 2006-07*” Volume X Issues No. 1, Commodity Markets, Policy Analysis and Projections Service, Trade and Markets Division, Food and Agriculture Organization of the United Nations.
- GoI (2001), “*Indian Planning Experience - A Statistical Profile*”, Planning Commission, Government of India, New Delhi, January 2001
- GoI (2002), “*10th Five Year Plan (2002-2007)*”, Planning Commission, Government of India, New Delhi.
- GoI (2006), “*Towards Faster and More Inclusive Growth: An Approach to the 11th Five Year Plan (2007-2012)*” Planning Commission, Govt. of India, December 2006.
- GoI (2007), “*Agricultural Statistics at a Glance 2006*”, Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India, New Delhi.
- Government of Punjab (2006), “*Statistical Abstract of Punjab 2005*”, Economic and Statistical Organization, Government of Punjab, Chandigarh.
- GoI (2007), “*Economic Survey 2006-07 and back issues*” Economic Division, Ministry of Finance, Govt. of India, New Delhi.
- Ministry of Water Resources (2007), Govt. of India, <http://wrmin.nic.in/>
- PAFC (2007), <http://www.punjabagro.com/cf.htm>
- Kumar, Pramod (2006), “Contract Farming through Agribusiness Firms and State Corporation: A Case Study in Punjab”, *Economic and Political Weekly*, Dec. 30, 2006, pp. 5367-75.
- Rangi, P.S. and M S Sidhu (2000), “A Study on Contract Farming of Tomato in Punjab”, *Agricultural Marketing*, Vol. 42, No. 4, pp. 15-23.
- Singh, Gurdev and S R Asokan (2005), “*Contract Farming in India: Text and Cases*”, Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
- Singh, Sukhpal (2002), “Contracting Out Solutions: Political Economy of Contract Farming in the Indian Punjab”, *World Development*, 30(9), pp. 1621-38.

CURRENCY

Currency Unit: Indian Rupee (Rs.)

US\$1.00 = Rs. 40.36 (as on August 3, 2007)

ACRONYMS

APEDA	Agricultural and Processed Food Products Export Development Authority
APMC	Agricultural Produce Marketing Act
CSO	Central Statistical Organization
DCMSCL	DCM Shriram Consolidated Limited
ECA	Essential Commodities Act
FAO	Food and Agriculture Organization
FCI	Food Corporation of India
GDP	Gross Domestic Product
GoI	Government of India
GSDP	Gross State Domestic Product
HYVs	High Yielding Varieties
ITC	Indian Tobacco Company
MoA	Ministry of Agriculture
MSP	Minimum Support Price
NABARD	National Bank for Agriculture and Rural Development
NDC	National Development Council
PAFC	Punjab Agro Foodgrains Corporation
PAIC	Punjab agro Industries Corporation

UNIT MEASUREMENTS

ha	hectare
hectare	2.471 acre
kg	kilogram
Quintal	100 kg
Lakh	100,000
Million	10 lakh
Billion	10 million
Crore	10 million